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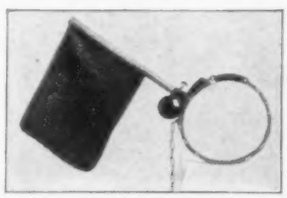

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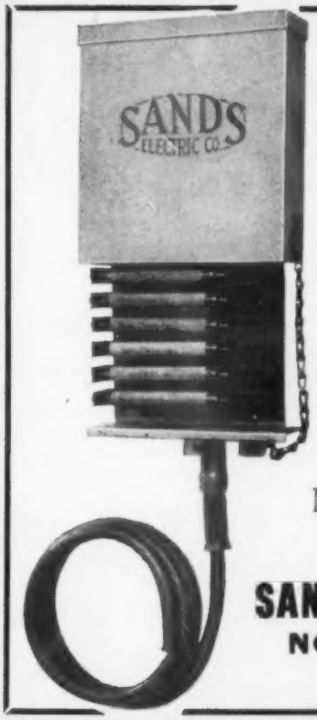

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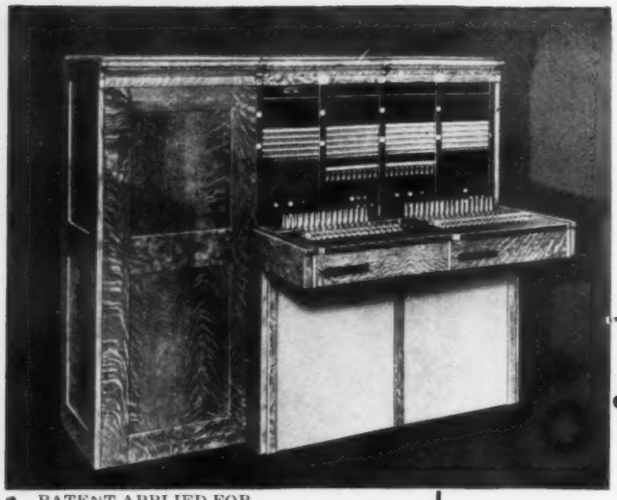

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In these times of shrunken revenue, Mr. Higgins cuts his operating expense at Festus, Missouri, by installing the finest common battery equipment available. He knows that common battery service is more profitable because his long experience has proved this in exchanges of various sizes.

For his Festus exchange, he naturally selected a Masterbuilt switchboard, because its flexibility principle appealed to him instantly. It enables the Scotia Telephone Company to meet present problems in the best manner and still be prepared to handle future growth simply and economically when the time comes.

The Festus cutover not only demonstrates the operating and economic advantages of Masterbuilt equipment, but it also provides the kind of service that keeps subscribers on the list. Let a Masterbuilt Switchboard help solve your problems.

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P. KERR HIGGINS, PRESIDENT & GEN. MANAGER

Scotia Telephone Company

General Office-St. Louis, Mo.

7227 DARTMOUTH AVENUE

ADDRESS ALL COMMUNICATIONS TO THE COMPANY

Kellogg Switchboard & Supply Company
1066 West Adams Street,
Chicago, Illinois.

Gentlemen:.

This letter of commendation comes from a satisfied user of Masterbuilt equipment, and from one whose experience has proven again that common battery equipment is more economical regardless of the size of the exchange.

Some months have elapsed since we installed our new Masterbuilt switchboard at Festus, and we feel satisfied that our selection was both wise and proper. The equipment and the installation are up to the best telephone standards.

As you know, before the cut-over we operated a magneto system at Festus - incidentally also using Kellogg equipment. We had a steady growth in stations and toll, resulting in the need for larger switchboard capacity. It did not take us long to decide upon a Masterbuilt switchboard because the flexibility principle appealed to us instantly. It enabled us to meet our present problems in the best manner, and still be prepared to handle our future growth when the time comes, without going through the usual costly procedure and investing in surplus idle equipment.

Our present investment represents only that equipment which we are using today. When we need another local or toll position we will procure it then, with the assurance that the job will be done more economically and with practically no interruption in service.

We operate common battery equipment in exchanges of various size, and in our opinion, it is the most economical service for any exchange with 200 or more local subscribers. Our new service at Festus, through the Masterbuilt switchboard, has demonstrated these economies in addition to assuring satisfied subscribers and the attractive possibility of securing higher rates.

Naturally our new service is far superior to the old, and our subscribers have definitely shown their preference for a common battery plant.

Very truly yours,

THE SCOTIA TELEPHONE COMPANY

P. Kerr Higgins
President

Masterbuilt SWITCHBOARD

THERE ARE *More* KELLOGG *Manual* SWITCHBOARDS

Telephone Engineer

Published Monthly by TELEPHONE ENGINEER PUBLISHING COMPANY
Office of Publication: Morton, Ill. Editorial Office: 185 North Wabash Ave., Chicago, Ill.
J. A. SMITH, President and Treasurer, 185 N. Wabash Ave., Chicago — C. L. JONES, Vice-President, Athens, Ohio
D. WEINER, Secretary, 185 N. Wabash Ave., Chicago — RALPH C. RENO, Vice-President, Chicago
HAROLD L. BEYER, Vice-President, Chicago, Ill.
F. A. BOWDLE, Vice-President, Wheaton, Ill.
RALPH C. RENO, Editor, 185 N. Wabash Ave., Chicago
Eastern Representative, H. S. DURLAND, 63 Hinsdale Pl., Newark, N. J., Telephone BRanchbrook 3-2217
SUBSCRIPTIONS:—The subscription price of TELEPHONE ENGINEER is $2.00 a year in the United States, Cuba and Mexico; in Canada it is $3; in all other countries $4. Single copies, U. S. A., 20 cents.
ASSOCIATED PUBLICATIONS: ENVELOPE & SPECIALTY PAPER INDUSTRY, SOUTHERN FLORIST & NURSERYMAN, DRYCLEANING PROGRESS, AUTOMATIC WORLD
Entered as second-class matter, at the post office at Morton, Ill., under the act of March 3, 1879.

Volume 37 — JANUARY, 1933 — No. 1

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E D I T O R I A L S

The Annual Convention Telephone men should make every effort to attend the Annual Convention of the United States Independent Telephone Association this year.

The dates for the convention have been changed from the usual convention time in October to July 11, 12, 13 and 14 and will be held in the Tower Room of Hotel Stevens, Chicago.

Secretary MacKinnon is giving considerable thought and time in arranging a program that will be educational and instructive as well as entertaining and one which will deal with the present telephone problems and their solutions. The first reason why telephone men should plan to come to the convention.

The second reason—by the time the convention rolls around the Century of Progress, the Chicago World Fair, will be in full swing and by attending

the convention delegates will be able to "kill two birds with one stone."

Although the convention takes place in the heat of the summer, the committee has seen to it that those attending the meeting will not suffer, by engaging the Tower Room, on the roof of the Hotel Stevens (overlooking the World Fair grounds), where cool air is at a premium.

We repeat—telephone men should make every effort to attend their annual convention.

Time For United Action

With increased demands throughout the country on the part of the public for reductions of telephone rates, it is about time for the telephone industry to show some concentrated action to stem the tide of this sweeping unfavorable reaction.

Day by day through newspapers, magazines and various civic and club meetings agitators are demanding that rates be lowered "in keeping with the general reduced cost of living." And—there is no use kidding ourselves—these campaigners are collecting a big following.

This agitation presents a serious problem to telephone companies. The time has come when our industry as a whole must form a united plan of action to combat the efforts put forth by these uninformed and in most cases "racketeering" agitators. The fight has been brought to our door and we must meet it collectively. In numbers there is strength.

During the past two or three years there have been offered several solutions to this problem, but as yet none of them has resulted in much success.

One of the surest ways to "gag" the boisterous agitator is for every operating company in the industry to keep inside and outside plants in the best of condition and provide subscribers with the best service possible.

In many cases agitation for reduced rates centers in communities in which telephone companies are not spending money and are letting their equipment and outside plants run down to the point where the rendering of the most efficient service is impossible.

One of the best 1933 resolutions, although it is a little late, that telephone executives could make is to religiously spend the depreciation reserves they have set up for new equipment, repairs and maintenance of their plants. Where such reserves do not provide sufficient funds, other means should be resorted to in order to carry on this valuable work.

Spending depreciation reserves for equipment and materials with which to maintain high grade service would go a long way in healing the wounds of the public, cut by the "howling and ruthless" agitator. And—at the same time the agitator would have no foundation upon which to base his claims that rates should be reduced because of the "enormous profits made" by the telephone companies.

Installing new equipment and making improvements would have another good psychological effect on the public. To do this, telephone companies would have to employ additional local labor and they could point out to their subscribers that they are doing their part in putting men back to work in order to help relieve unemployment. The fact that telephone companies would have men out on the streets and highways working would create a favorable reaction toward the companies.

We might say that during a visit in a certain eastern town we heard comments made by several persons that "the telephone company certainly deserves a lot of credit for keeping their employees on the job." We are convinced that this builds up a great amount of good-will for the telephone company.

"The telephone company that keeps up normal repairs and that spends each month on renewals and replacements of worn out property the amount it is currently collecting from its subscribers for depreciation charges, is not only helping the telephone industry's employment situation but is showing enlightened selfishness. . . .

"The best goodwill builder in the world is to replace for present subscribers those old, old telephones and private branch exchange boards with new and up-to-date equipment. Those telephones and private branch exchange switchboards that have not reached the age of retirement should be reconditioned now either in your own shop or, preferably, in your supplier's factory where the work will be done even better and fully as economically."

Companies that will best weather the storm caused by the rate reduction agitation will be the ones that immediately put their houses in order by making replacements of and additions to equipment. That this statement has a good foundation is evidenced by the fact that during the past few months rates have been raised in some communities in which telephone companies have installed new equipment and have made outside plant improvements.

And—looking at the subject from another angle, why shouldn't telephone companies buy now? They are able to get better prices and delivery service than at any time during the past decade or two. In addition labor costs are lower than they have been for years.

There has never been a time when spending money to improve service and maintaining it will build up good-will, break up the fight for reduced rates and help the telephone industry as it will right NOW — in 1933.

1932 PROVIDES NUMEROUS OUTSTANDING EVENTS—MONTH BY MONTH REVIEW OF YEAR

JANUARY

MASSIE CASE—One of the biggest news stories of the year grew out of the kidnapping and killing of Joseph Kahahawai, Hawaiian "beach boy," by Mrs. Granville R. Fortescue, her son-in-law, Lieut. Thomas H. Massie, U. S. N., and E. J. Lord and Albert O. Jones, naval enlisted men, at Honolulu. The four were arrested, tried, and finally pardoned after threats of a "cleanup" of the island had been made in congress and from other governmental sources. The killing, which Mrs. Fortescue afterwards made the subject of a magazine "confession" story, followed the acquittal of Kahahawai and three others for an assault on Mrs. Massie.

FEBRUARY

NEUTRON DISCOVERED — Dr. James Chadwick, working in the Cavendish laboratory at Cambridge, announced on Feb. 27 that he had discovered neutron, one of the ultimate particles of nature. The discovery was hailed by scientists the world over as the most important achievement in experimental physics since Lord Rotherford demonstrated the nuclei structure of the atom in 1911.

BATTLE OF SHANGHAI — Japan and China began their undeclared war at Shanghai on the night of Jan. 28, which was chiefly the outcome of a Chinese boycott applied in retaliation for the Japanese invasion of Manchuria. The battle raged practically without interruption during February. Several thousand were killed and wounded on both sides. The United States and other nations rushed troops and warships to the scene to protect their nationals. A peace agreement was finally signed on May 5, the Chinese agreeing to stop their boycott activities.

MARCH

LINDBERGH BABY KIDNAPPED —On the night of March 1, some time between 8:30 and 10 o'clock, Charles Augustus Lindbergh, 20 months old son of Col. and Mrs. Lindbergh, was stolen from his nursery on the second floor of the flyer's home near Hopewell, N. J. Weeks later the battered body of the infant was found hidden in a clump of bushes by the roadside a few miles from his home. Examination disclosed that the child's skull had been crushed as if with a blow from a hammer—probably a few minutes after he had been lifted from his cradle.

IVAR KREUGER SUICIDE — The world of finance was shaken to its foundations by the suicide of Ivar Kreuger, head of the Swedish match trust and one of the financial giants of the age, in Paris on March 12. A subsequent investigation revealed that forged bonds, dummy directors, fictitious assets and non-existent companies figured in the collapse of the $1,000,000,000 match empire established by Kreuger before he shot himself to death in a hotel room.

APRIL

INSULL CRASH — Samuel Insull still ruled a vast utilities empire as 1932 opened. April 16 saw the Middle West Utilities receivership, signal for the crash of his financial pyramid. Insull went to Paris, then fled to Athens as investors discovered the enormity of their losses and the grand jury acted. A Greek court in December refused extradition.

MAY

AMELIA EARHART—Aviation circles and the world in general were electrified by Mrs. Amelia Earhart Putnam's flight across the Atlantic May 21, the first solo air crossing of the ocean by a woman.

CAPONE IN PRISON — The year 1932 found Al Capone in the county jail, appealing Federal Judge Wilkerson's 11 year sentence for income tax frauds. His appeal lost, Chicago's public enemy No. 1 became convict No. 40866 in the Atlanta penitentiary on May 4.

JUNE

THE CONVENTIONS—Republicans, convening June 14 in the Chicago Stadium, knew they would renominate President Hoover. They straddled on prohibition. The Democratic convention demanded repeal. "Stop Roosevelt" was the cry for three ballots. Then McAdoo and Garner made their midnight deal, and the New York Governor flew to Chicago to accept the nomination.

SIAM'S BLOODLESS REVOLUTION—Siam's absolute monarchy, one of the last to go, was toppled when the army and navy combining as a new "people's party" revolted and forced King Prajadhipok to sign a constitution restricting his rule.

JULY

LAUSANNE CONFERENCE—Germany on July 8 reached an agreement with the former allies ending reparations. Under the agreement Germany's indebtedness was reduced from 26 billion dollars to 714 million dollars, and reparations and the Young plan cease to exist. The ratification of the Lausanne treaty was conditioned on a "gentlemen's agreement" calling for satisfactory reductions in war debts on the part of the United States on the scale of relief granted Germany.

BONUS RIOTS—Amidst scenes reminiscent of the mopping up of a town in the world war federal troops on July 28 drove the army of bonus seekers from the shanty village of Pennsylvania avenue, Washington, in which the veterans had been entrenched for months in an effort to induce congress to grant a cash bonus. Earlier in the day the police had fought and lost a battle with the veterans, one bonus seeker being killed and a long list of others being injured in the fighting.

AUGUST

TOTAL SOLAR ECLIPSE—A total eclipse of the sun on Aug. 31 furnished the "thrill of a lifetime to millions" of spectators and resulted in important new scientific discoveries, among them being that of a new asteroid and disclosures which may lead to the solution of the cosmic ray puzzle.

PICCARD'S STRATOSPHERE FLIGHT—On Aug. 10 Prof. Auguste Piccard, the stratosphere man, made an ascent of 10.4 miles in his metal balloon to obtain new data bearing on his pet hobby, the cosmic ray. He was in the air some 12 hours, drifting over middle Europe.

SEPTEMBER

GANDHI FASTS—Mahatma Gandhi, frail leader of India's untouchable millions, went on a "fast unto death" on Sept. 20 in Yeravda prison at Poona as a protest to the Indian electoral system. The Mahatma ended his fast in six days and five hours when the British government announced its conditional acceptance of a compromise electoral system drawn up by caste Hindus and "untouchables."

PORTO RICO HURRICANE — A hurricane ripped its way across Porto Rico on Sept. 27, killing 245 persons, injuring 3,329 more, and destroying 36,249 buildings. Whole towns were leveled

by the wind, which attained a velocity of 120 miles an hour, and numerous ships were driven ashore.

WALKER RESIGNS — New York lost its playboy mayor, the dapper wise cracking James J. Walker. Jimmy got by for almost two terms, until Samuel Seabury's state investigating committee yanked him before Gov. F. D. Roosevelt. For months the accusations and insinuations broke hot and fast around his head. On Sept. 1 Jimmy resigned and later went away to Europe.

OCTOBER

WORLD'S BIGGEST LINER—Amid scenes of national rejoicing the new French 75,000 ton trans-Atlantic liner Normandie, the largest ship in the world, was launched at St. Nazaire, France, on Oct. 29. Mme Lebrun, wife of the French president, christened the new ocean queen.

NOVEMBER

THE ELECTION — Unquestionably the major event of November, not only from the American viewpoint but from that of the entire world, was the election which resulted in the selection of Gov. Franklin D. Roosevelt of New York as President to guide the destines of the nation for the next four years. To co-operate with the new chief magistrate the voters chose a Democratic congress, members of that party being selected to supersede Republicans in a large percentage of contests for seats in both houses.

DECEMBER

FRANCE DEFAULTS — France defaulted on her 20 million dollar war debt installment due Dec. 15 and the cabinet headed by Premier Edouard Herriot was overthrown in the percussion. Joseph Paul-Boncour succeeded to the premiership and set up a new government which has re-opened negotiations looking to possible payment of the installment.

ASSOCIATED TEL. UTILITIES CO. ANNOUNCES CHANGE IN ORGANIZATION

Changes in executive organization of the western properties of the Associated Telephone Utilities company affecting the states of Arkansas, California, Idaho, Kansas, Louisiana, Montana, Missouri, New Mexico, Nebraska, Oklahoma, Texas, Washington and Wyoming were announced recently.

S. L. Odegard, formerly president of the western properties of the Associated Telephone Utilities company with offices in Los Angeles, moves to New York as operating vice-president of the Associated Telephone Utilities company.

Charles F. Mason, formerly senior vice-president and general manager of the Associated Telephone company, Ltd., the Southern California Operating company, becomes executive vice-president of that organization.

A. L. Hart, formerly vice-president of all western operating companies excluding the California properties, becomes operating vice-president for all western properties including those properties in the State of California.

The executive offices of the western properties were moved from Los Angeles to Long Beach, December 1, 1932.

The western operating companies of the Associated Telephone Utilities System operate approximately 300 exchanges in thirteen states comprising more than 128,000 telephone stations.

The Asosciated Telephone company, Ltd., the operating company in Southern California, serves more than 75,000 telephones located in the following cities: Long Beach, Santa Monica, Pomona, San Bernardino, Westwood, Ontario, Upland, Covina, Redondo Beach, Huntington Beach, Laguna Beach, Malibu Beach, Lake Arrowhead, Westminster and Etiwanda.

In addition to the Southern California properties, the Long Beach executive office will direct operations of the Interstate Telephone company serving Wennatchee, Washington; Coeur d'Alene, Idaho; Cashmere, Washington; Wallace, Idaho; Kellogg, Idaho; Moscow, Idaho; Pullman, Washington, and other cities in Washington, Northern Idaho and Western Montana.

Other properties of the Associated Telephone Utilities company in the west under the jurisdiction of the Long Beach executive office include the Southwestern Associated Telephone company operating extensively throughout the states of Texas, Oklahoma and New Mexico; the Central Missouri Telephone Company serving Warrensburg, Lexington and other Missouri cities and the Platte Valley Telephone corporation serving Scottsbluff, Nebraska, and surrounding territory.

MRS. H. D. FARGO PASSES AWAY AFTER BRIEF ILLNESS

Mrs. H. D. Fargo, wife of H. D. Fargo, president of Telephony, telephone trade journal, passed away December 27 following a brief illness with influenza. Mrs. Fargo was very well known in Chicago women's golf circles, having held the women's championship of the Edgewater Golf Club for six years. She also served as chairman of the women's committee of the North Shore Golf Club in 1932, and had been reelected for this year.

Mrs. Fargo is survived by her husband and son, H. D. Fargo, Jr., vice-president and advertising manager of Telephony.

E. WINSTON RODORMER WEDS SYRACUSE GIRL

Mrs. Daniel Murray Edwards of Syracuse, New York, recently announced the marriage of her daughter, Mary Elizabeth, to Everett Winston Rodormer, son of Mr. and Mrs. G. W. Rodormer of Park Ridge. Mr. Rodormer is prominent in telephone circles, being advertising manager of the Reliable Electric company, of which his father is secretary. The marriage took place Wednesday, January 4, at Syracuse.

HUGH A. BARNHART NAMED INDIANA HIGHWAY DIRECTOR

Hugh A. Barnhart, son of Henry A. Barnhart of Rochester, Indiana, president of the Indiana Telephone Association and widely known telephone man, recently was elected director of the Indiana Highway Commission.

This is one of the most important and responsible positions in the state of Indiana as it carries with it the control of

HUGH A. BARNHART.

construction and maintenance of several thousands of miles of state roads and the millions of dollars of state and national funds invested in them.

The younger Barnhart, like his father, was a newspaper publisher at Rochester. Mr. Barnhart is a graduate of Indiana University, where he was prominent in football and basketball activities. He served as captain during the World War. He always has been active in business and civic affairs in his community.

He frequently attends telephone conventions and is well known to telephone men, who will be pleased to hear of the appointment to his new position.

Engineering and Management Course

Section III—Automatic Exchange Practice

Subject 3.1—General Features of Automatic and Semi-Automatic Exchanges.

This Is a Continuation of a Series of Articles by B. C. Burden, Transmission Engineer, Lincoln Telephone and Telegraph Company, Lincoln, Nebraska, the Last Installment Appearing in January, 1932. The Series Will Be Continued During 1933.

General

Some months ago a series of articles under the head of "Telephone Engineer's Engineering & Management Course" were started and appeared during 1931 and part of 1932. The purpose of this Course was to furnish information of a fairly detailed character on the various phases of engineering, construction, theory, and maintenance of the small and medium sized exchange. This course was intended to be of maximum benefit to the exchange manager and wire chief, and was planned to cover with as much detail as possible all subjects with which the exchange manager is ordinarily concerned.

This issue of Telephone Engineer resumes the Course, and each succeeding issue during 1933 will carry an article in the series. For reference use the following summary giving the titles and section numbers of preceeding articles in the series.

Index of Engineering and Management Course

Section I—Magneto Exchange Theory and Practices.

1.1—Theory and Design Features of Transmitters, Receivers, Induction coils, etc.—Feb. 1931.

1.2—Theory and Design Features of Magneto Switchboards — March 1931.

1.3—General Features of Magneto Central Offices—April 1931.

1.4—Theory of Power Ringing Machines—May 1931.

Section II—Common Battery Exchange Theory and Practice.

2.1—Theory of Common Battery Subscribers Sets—June 1931.

2.2—Theory and Design Features of Common Battery Switchboards—July 1931.

Fig. 1. Typical Automatic Dial. (Automatic Electric Co.)

2.3—Common Battery Multiple Switchboards and Relay Data—August 1931.

2.4—Super - Service Type Manual Switchboards—September 1931.

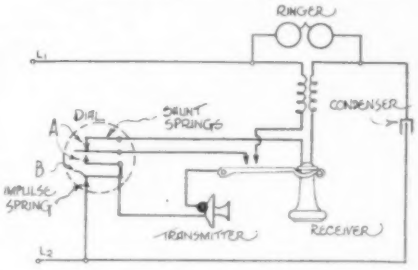


Fig. 2. Schematic circuit of C. B. Dial telephone.

2.5—Central Office Storage Batteries —December 1931.

2.6—General Features and Arrangement of Common Battery Manual Offices—January 1932.

This article discusses the general features and basic theory of automatic and semi-automatic telephony.

Types of Automatic Exchanges

The term "automatic exchange" refers to the use of electro-mechanical switching equipment to accomplish the functions of connecting, signalling, and supervising telephone calls between subscribers.

Automatic exchanges are of two general classes; viz, those that are completely automatic, and which require no human assistance other than the subscriber dialing operation to complete a call, and a second class which requires that an operator receive the calling party's number, which is then passed by various means to electro-mechanical switches which set up the desired connection relieving the operator of this work.

The first class are generally referred to as "automatic exchanges" or in some cases "full automatic" whereas the latter class are designated as "semi-automatic", "automanual" or some similar term in which a distinguishing prefix in front of the word automatic indicates that the operation requires the assistance of an operator in completing a call.

It is interesting to note that the invention of the automatic switching principle came only a short while (1879) after the invention of the telephone. The initial automatic exchange was installed at LaPorte, Indiana, in 1893.

Automatic Exchanges are now found in all parts of the world, and are especially popular in the larger cities. Of recent years there has been an increasing trend toward the use of automatic equipment in the smaller towns.

There are three distinctive types of automatic systems now in use which are as follows:

1. The Strowger (step-by-step) System.
2. The Panel System.
3. The All Relay System.

These three types of automatic systems are not merely modification of each other but represent three radically different mechanical switching principles. They all have the common feature, however, of a subscribers telephone equipped with a dial, which when operated by the subscriber results in the dial "pulsing" electro-mechanical equipment at the central office which selects the desired number.

Fig. 3. Mechanism of modern dial, showing the governor, impulse spring, impulse cam and shunt springs. (Automatic Electric Co.)

The Strowger system which is also referred to as the "step-by-step" system is manufactured by the Automatic Electric Company of Chicago. The Panel system is a Bell development and is manufactured by the Western Electric Company. The Western Electric Company also manufacture some "step-by-step" equipment which is used by Bell System Companies.

The All-Relay System is manufactured by the North Electric Mfg. Company of Galion, Ohio.

Because of the specialized nature of automatic equipment and the fact that Telephone Engineer several years ago carried an extensive series of articles which covered quite fully the detailed theory of automatic equipment, no detailed information on the operation of automatic equipment will be given in this Course, but only a general discus-

sion of the basic theory of each type of Automatic system.

The Strowger or (Step-by-Step) System

The Strowger System of Automatic telephony was conceived in 1889 by Almon B. Strowger whose name it bears. While full credit must be given to the man whose imagination and ingenuity gave birth to this excellent system, no less credit is due the continued and exhaustive efforts of the Engineering staff of the Automatic Electric Company in bringing the crude invention of Strowger up to its present highly developed form.

The first exchange which was installed at La Porte, Indiana, had a total capacity of only 100 lines. Following the installation of this exchange development was rapid and by 1901 the art of automatic switching had developed to the point where the size of the exchange was no longer limited to a few hundred lines, and from this time on the growth of Automatic telephony has been rapid.

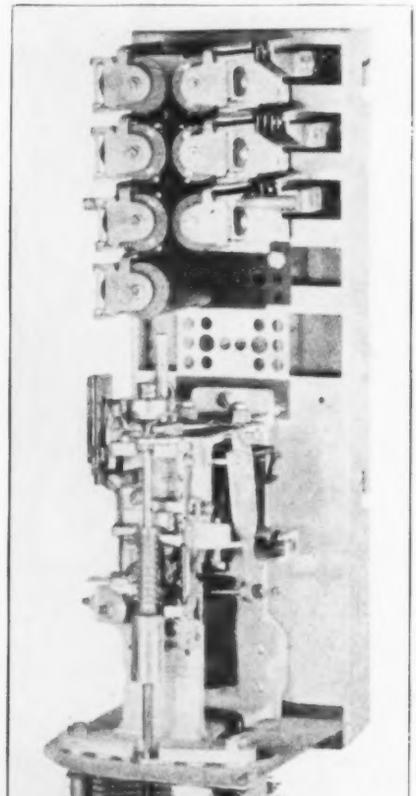


Fig. 4. Type of switch used as selectors and connectors in Strowger system. (Automatic Electric Co.)

The Dial

Before discussing the general mechanical features of the Strowger automatic system let us consider briefly the dial by means of which the subscriber on an automatic exchange selects any desired telephone number.

In an automatic exchange each telephone is equipped with a dial similar to the one shown in Figure 1. The dial is connected in the subset circuit as shown in Figure 2. The function of the dial is to interrupt (pulse) the direct current flowing from the central office to the subscribers' set, the number of pulsations being determined by the number "dialed" by the subscriber.

The pulsing of the direct current due to the operation of the dial causes mechanical switches at the central office to select the desired number and ring the called party.

To make a call, the calling subscriber lifts the receiver and placing a finger in the hole in the disc through which the first figure of the desired number appears, then pulls the disc around in a clockwise direction until the finger strikes the finger stop, and the disc is then released. The main spring of the dial (see Figure 3) causes the disc to return to normal, and this action causes an impulse cam to operate spring B which automatically opens and closes the line to the central office, thus interrupting the flow of direct current from the central office. The number of pulses corresponds to the number "dialed".

By means of what are known as "off normal" contacts (shown in Figure 3) the circuit to the receiver is automatically opened and a "short" thrown around the transmitter during the dialing operation. The purpose of the off normal springs is to prevent clicking in the receiver, and to remove the transmitter from the dialing circuit. In order to give the impulses a definite frequency or speed the actuating mechanism of the dial is provided with a governor.

Dials are usually adjusted to give a pulsing frequency of approximately 10 per second. Each digit of the desired number is selected by a repetition of the procedure just described.

The dialing operation is the same for each of the three types of automatic systems. The dial can be used with any type of telephone subset circuit, however, practically all modern subsets utilize the "booster type" talking circuit as shown in Figure 2.

Basic Elements in Strowger System

The most important element in a Strowger system are the "step-by-step" electro-mechanical switches as shown in Figure 4. These switches which are known as "selector" or "connector" switches are the mechanical robots which displace the operator, and which with uncanny rapidity and precision select, test, and ring the desired line. The essential mechanical elements of these switches are as follows:

1. A central shaft capable of both vertical and rotary movement.
2. A pawl and ratchet actuated by an electro-magnet for stepping the shaft vertically.
3. A pawl and ratchet actuated by a second electro-magnet for stepping the shaft in a rotary direction.
4. One or more sets of thin wiper springs which are attached to the control shaft.
5. A semi-circular bank of 100 sets of contacts, so spaced and arranged that the wiper springs if stepped vertically upward and then in a rotary direction can be made to select any set of contacts on the bank.
6. A group of relays mounted on the frame of the selector and used to control the operation of the switch.
7. A release mechanism to restore wipers to normal (non-operated) position after completion of conversation.

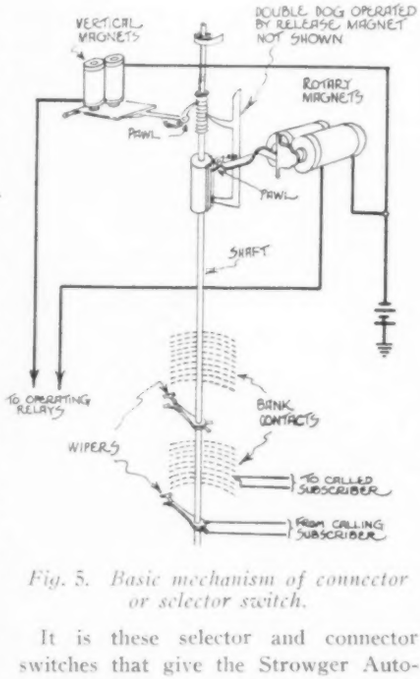


Fig. 5. Basic mechanism of connector or selector switch.

It is these selector and connector switches that give the Strowger Automatic system the name "step-by-step", which had its origin in the fact that the vertical steel rod which carries the wipers is moved up and around one step at a time.

The "stepping" is accomplished either under the control of the dial pulses, or partly under the control of the dial and partly automatically depending on the specific function of the switch in question.

Figure 5 illustrates the basic operating mechanism of a "step-by-step" switch, none of the control relays being shown, only the vertical and rotary operating

(*Continued on page* 22)

Telephone Activities in Foreign Countries

Dispatches from Abroad Keep Telephone Men in United States Constantly Informed Concerning Telephony of the World; Domestic Telephone Problems Oftentimes Can Be at Least Partially Solved by Watching the Outcome of Experiments Made Elsewhere

Moscow (Russia) to Have 714,000 Telephones by 1937

According to the "Moscow Weekly News," Moscow will have 714,000 telephones by the end of 1937. About 214,000 will be in factories and offices, and the remainder in apartment houses. This will be nearly six times the number of telephones in use in Moscow today, which has now only about 120,000, an average of three per hundred inhabitants. Four automatic exchanges have been built during the past year and a fifth is practically completed.

New Telephone Exchange to be Built in Stockholm (Sweden)

The Royal Swedish Telephone and Telegraph Department has drawn up plans for a new and modern telephone exchange in Stockholm and has requested the Swedish government to appropriate 2,000,000 crowns (par value of crown is 0.268) to cover the cost of the site and getting the construction under way. The new building will house the 10,000 telephone lines which still remain to be made automatic in Stockholm. It is estimated that the building, equipment and installation work will cost about 3,200,000 crowns and the site 792,453 crowns. Work will be started in the fall of 1933 and the new telephone exchange will be completed by July 1, 1934, according to present plans.

Reduction of Telephone Rates in Philippines

The Philippine Long Distance Telephone Company has been authorized by the Public Service Commission to reduce its telephone charges by one peso ($(.50) in all its divisions in Luzon outside of Manila, effective October 1. The same reduction also applies to Cebu Province. Iloilo Province also wants a reduction. The Manila division of the company will also have reduced rates whereby the subscriber will be charged for the number of times he uses the telephone. New apparatus will be installed to enable the company to determine the charge. The reduction in Manila became effective January 1, 1933.

Canadian Broadcasting Commission Appointed

The Canada Gazette of October 15, 1932, announces that the Governor General in Council has appointed the following to be members of the Canadian Radio Broadcasting Commission: Hector Willoughby Charlesworth (Chairman), Thomas Maher (Vice-Chairman), and William Arthur Steel. Mr. Charlesworth is a Toronto journalist, dramatic critic, and editor. Mr. Maher comes from Quebec City and is reported to be a forestry expert who has had some radio experience in operating a small station in Quebec. Lt. Col. Steel is a well-known Ottawan and a technical radio expert.

Telegraphic Flashes from China

A powerful American type short wave station for radio broadcasting and radiotelephonic purposes is being installed in the Portuguese Colony of Macao in South China. A contract was recently closed for an automatic telephone system in Changsha, Hunan province.

Swiss Loan for Belgian Telegraph and Telephone Service Over-Subscribed

It is announced that the loan of the Belgian Telegraph and Telephone Monopoly floated in Switzerland has been over-subscribed. The loan amounted to 31,200,000 Swiss francs, and the interest rate is 5 per cent. (Swiss franc equals about $0.19.) This loan is part of the 750,000,000 Belgian francs which the Monopoly was authorized to borrow in 1931.

Danish Telephone Statistics

Length of line of the Danish telephone system as of January 1, 1932, totaled 1,633,395 kilometers compared with 1,542,287 for the previous year. Subscribers totaled 301,756 as against 295,341 the year before. Apparatus in use numbered 356,932 compared with 348,513 a year ago; number of exchanges dropped from 1,831 on January 1, 1931, to 1,825 on the corresponding day of 1932.

Proposed Police Telephone System for Buenos Aires

The sum of 756,000 paper pesos was obtained recently by public collection in the city of Buenos Aires, which is estimated about half of the amount needed to carry out plans for a new police telephone system in that city.

It is proposed to lay about 240 kilometers of cable to connect 242 police call boxes to be installed on street standards and 45 police stations, as well as to provide for six independent circuits to be installed at the central police station.

Official Egyptian State Telegraph and Telephone Statistics

The following is a comparison of the accounts of the Egyptian State Telegraph and Telephone for the year ended April 30, 1932, and the same period for 1930-1931:

	——1931-1932——		——1930-1931——	
	No. Messages	Value L. E.	No. Messages	Value L. E.
TELEGRAPHS—				
Local Traffic	3,488,404	112,568	4,056,906	133,108
Foreign Traffic	410,458	26,171	431,133	27,758
Wireless Shipping Traffic	18,193	5,039	21,439	6,546
Royalties	—	28,822	—	32,790
Rentals	—	6,845	—	3,207
Totals	3,917,055	179,445	4,509,478	203,409
TELEPHONES—				
Local Traffic	—	357,316	—	477,407
Trunk Traffic	3,202,719	149,216	2,695,109	170,066
Miscellaneous	—	2,549	—	3,258
Totals	3,202,719	509,081	2,695,109	650,731

(Par Value Egyptian Pound $4.943)

Subscribers telephone installations for the year ended April 30, 1932, were 43,255 as compared with 42,830 for the previous year.

RENOGRAPHS

This department edited by Ralph C. Reno, field editor for Telephone Engineer. Your cooperation in making this section interesting will be appreciated. Bid him welcome and you will find a sympathetic listener. Impart your news cheerfully and we'll all feel cheered.–Editor

We left you at Slippery Rock, Pa., last month on our journey across the hills of the East and the wide prairies of the Middle West.

* * *

Butler was our next stop and in talking with A. O. Black and others of the Peoples Telephone Company, we immediately realized that we were in the midst of one of the most spirited Employees Sales Campaigns we had ever seen carried on. It's the spirit that prompts such questions and statements as "How many new ones did you get?"; "Did you get any today?"; "Well, I saved that one"; "I got Mr. Jones today," that keeps the campaign full of pep and that is making it successful. Everyone is working hard and if we don't miss our guess this campaign has a lot to do with keeping down station losses in Butler.

* * *

Oh, yes, there is one industry that is really flourishing in Butler—the automobile industry. You didnt know they made automobiles in Butler? Well, they do — the Austin, America's "'midget" car. We were told that the factory could not keep up with orders, most of which come from the South—the land of high gas taxes.

* * *

The Peoples Telephone Company uses two Austins. One of them has 39,000 miles to its credit. And—when we were told they would make 39 miles to a gallon of gasoline and that four of them can be stored in space required for two ordinary cars—well, we could see that perhaps they have a place in American industry after all.

* * *

We almost had to cut our way into Pittsburgh with its triangled and angled streets and although there was just as much smoke and soot as ever we learned that business in the Smoky City was about the same as it is in other cities we had visited.

* * *

Our next stop was Cadiz, Ohio. We had been patting ourself on the back for having such pleasant weather during our journey, but at Cadiz ol' man winter unlashed his fury with a white blanket of snow, rain and ice. But—being more or less an admirer of nature we marvelled at God's white winter decoration painted on the hills and trees—which forstalled the usual grumbling that comes with driving on slippery pavements.

While in Cadiz we visited J. F. Smith of the Ohio Community Telephone company. Mr. Smith informed us that his loss of stations had diminished and that December found less takeouts than in previous months. Toll business also had picked up during this month. Mr. Jones stated that he was going to canvass the miners in his district who had no phones, because some of the mines were showing activity and he knew miners needed telephones in order to keep in close contact with their employers. This is a progressive move and we, like Mr. Smith, believe he will put in some new phones.

* * *

Conversing with John Sidlo at Cambridge, we learned that he was going after more business by putting on a paid solicitor. Work of rearranging prospect files was being carried on, previous to the concentrated campaign to increase subscribers.

* * *

Slowly we made our way to Athens—slowly because we could hardly see the roads for the snow—home of Ohio University, whose football team cleaned Navy last season, and the Athens Home Telephone company, managed by Dr. C. L. Jones and his son R. S. Jones.

* * *

Athens, not being an industrial town, has not felt the depression as much as other communities. We found that station losses had been kept down to a minimum, the greatest percentage of takeouts having come from the rural sections. The company was completing considerable underground cable work, necessitated by the construction of the new Federal road through that section.

* * *

We were shown through the new and magnificent home of the Athens company. One of the features of the building are two furnished apartments on the second floor for the wire chief and night man. They are always on the job and the Joneses know that their subscribers are getting the best of service at all times.

* * *

Another feature is that the operators can be seen working at the switchboard by all who enter the commercial office. The switchboard room is partitioned off from the rest of the office by glass panels. This, in our opinion, is a splendid idea as it shows subscribers part of the vast amount of the inside workings of a telephone exchange and lets them know that there is more activity in an exchange than just taking in their money over the counter.

* * *

And listen—another feature of this exchange is that we didn't spend any time waiting for Doc Jones—he's been on the job at 7 A. M. every morning for 30 years. We claim that's a record.

* * *

At Troy, Ohio, Warren Safford of the Troy Telephone company is doing a nifty job in advertising. He is circularizing the farmers, pointing out to them how important and valuable the telephone is on the farm and the many conveniences and protection it provides.

* * *

Counter cards and posters emphasize the facts that there is no Christmas gift like an extension telephone and that there is no protection that compares to the telephone in case of fire and like emergencies. This work is supplemented by newspaper advertising. There is no doubt that advertising stimulates telephone business as it does other industries.

* * *

One thing we learned on the trip was that, although the farmers are saying they haven't the money to pay for telephones, they do have more than many urbanites—a good cover over their heads and plenty of good food to eat. The truth of this statement was brought home very forcibly to the writer when he stopped at a favorite uncle's farm near Lafayette for a couple of days and enjoyed four consecutive chicken dinners with all the good trimmings that generally come with these substantial meals. The farmers may not have much cash, but one thing is certain—they will not starve.

* * *

After a month on the road we certainly were happy when we arrived at our destination—Chicago. Happy to be home and pleased with the results of our first trip, visiting telephone men. We can truly say we heartily enjoy being among the members of the great telephone industry and are anxious to be on our way again.

Temperature of Wiping Solder is Important

G. P. Dillon Gives Valuable Information Regarding Alloys and Other Properties in Solders—Methods of Heating and Applying Solder to Joints Discussed—New Device to Test Temperature on Market for Operating Men

Did it ever occur to you that wiping a telephone cable joint has a touch of black art in it? Solder is made of tin and lead. Should you attempt to join two pieces of tin together by running molten tin along the seam, the tin would melt that which you wished to solder.

Adding lead to solder reduces the melting temperature of the solder, thereby making it possible to join the two pieces of tin without melting them. Lead melts at 170 degrees higher temperature than tin, therefore it would seem that adding lead to the tin would require a higher temperature to melt it. However just the opposite condition results, as when tin and lead are mixed together the alloy melts at a lower temperature than does either metal by itself. Call it black art, magic, or what you wish, but the results accomplished with this alloy is the reason why lead and tin solder is so useful. It can be used to solder tin and lead units without melting the objects to be joined.

Wiping a Joint

The most interesting soldering operation of all is the wiping of cable joints. We have been discussing soldering tin. In cable joint wiping we have an example of joining lead to lead. When two pieces of cable are spliced to be made into one continuous length, the cable splicer applies wiping solder to the joint by means of a wiping cloth, wiping and smoothing the rapidly cooling alloy around the joint. When the job is finished the cable is a solid unit.

As you watch a cable man wiping a joint you admire his tact in handling the hot mass of lead-tin alloy as if it were clay, but unless you are unusually keen and inquisitive it may not occur to you that you are witnessing not only a feat of human skill but a still more remarkable and interesting feat of Mother Nature herself. To be specific, the solder that we see the tinner, the canner and the radiator manufacturer use is liquid when molten, but this hot solder in the cableman's hand is plastic and allows itself to be wiped around the cable like moist clay.

The cable man might possibly handle other solders in the same way, by allowing them to cool somewhat, but there is one solder he never could so handle and that is an alloy containing 63 per cent tin and 37 per cent lead. If such a solder was heated so that it would flow at all, it would run through one's fingers like any liquid. It would not help matters to heat it slowly so as to catch it at a point midway between the solid and the liquid states, for there is no such point with 63-37 per cent solder. It is all solid below 358 degrees F. and liquid above that point.

Intermediate Plastic State

With an alloy of tin and lead, which is different than the above formula, there exists an intermediate plastic state in which the alloy is neither a hard solid nor a free-flowing liquid. It does not matter which of the two metals is in excess, because the alloy, as it is heated, becomes plastic before it melts completely into a liquid, and again, as it cools, it becomes plastic before it sets solid. What makes the difference? It is really a case of making a pie of lead as we used to make pies of mud in our childhood days.

When lead and tin are fused together in the proportion of 63 per cent tin to 37 per cent lead, it forms an alloy that acts in many respects like a new metal. It may be melted and then cooled, either quickly or slowly, and it will still change from liquid to solid without an intermediate plastic stage, the resulting structure of the solid alloy being homogeneous.

If, on the other hand, you do the same thing with a solder containing any other proportions, say 40 per cent tin and 60 per cent lead, you will observe very different behavior. In the first place, you will observe the plastic state on heating and cooling, as described; then if you examine a cross-section of the fractured metal under a microscope you will find peculiar formations, sometimes very irregular ones. They will remind you of particles of one kind caught floating in a mass of different character and frozen there in the cooling of the mass. As a matter of fact, that is just what has happened. The first alloy, which acts like a homogeneous metal, is known as a eutectic mixture. The second alloy, which has an excess of lead, is not homogeneous but is made up of a portion of eutectic mixture and a portion of lead.

Now, as we have noted before, any alloy of tin and lead begins to melt at a lower point than either of these metals by itself, so that, if there is an excess of one of these metals in the mixture, it naturally will remain solid a little longer than the eutectic alloy, that is, the 63-37 per cent mixture. We thus have, in the case cited, some solid lead floating in the perfectly proportioned alloy that has melted. But it is not floating like a cake of ice in water.

The solid lead is dispersed or diffused throughout the molten alloy, like a very finely divided clay with just enough water to make stiff mud of it, which justifies the simile of making a lead pie. The mud pie and moist modeling clay are plastic because of the moistening of the finely divided solid part with a liquid, water. The solder is plastic because the solid excess lead, finely divided but nevertheless solid, is moistened with a liquid, the molten eutectic mixture.

Non-Eutectic Mixtures

As a matter of every-day use, all tin-lead solders are non-eutectic mixtures. The nearest to the eutectic mixture of 63 per cent tin and 37 per cent lead the practical solder user ever demands is 50-50. This is considered to be the highest grade of solder and has given rise to the universally known expression "half-and-half solder." Con-

CONVENTION SCHEDULE

Minnesota Telephone Association, Hotel St. Paul, St. Paul, January 25, 26 and 27.

Nebraska Telephone Association, Hotel Lincoln, Lincoln, February 14 and 15.

Iowa Independent Telephone Association, Hotel Fort Des Moines, Des Moines, February 23 and 24.

Oklahoma Utilities Association, Hotel Biltmore, Oklahoma City, March 7 and 8.

Texas Independent Telephone Association, Dallas, March 14 and 15.

United States Independent Telephone Asosciation, Tower Room, Hotel Stevens, Chicago, July 11, 12, 13 and 14.

sequently, most of the commercially used solders would serve as wiping solder, since they all have a plastic stage between the solid and the molten state.

The 50 - 50 solder however, is so near the eutectic that its period of plasticity is brief, and there is too much liquid for the solid element. To try to wipe it would be like trying to mould a mud pie when too much water had been used. Such a solder is not sluggish enough to be used as a wiping solder. It is common practice of solder manufatcurers, therefore, to prepare especially for plumbers' use solder with more lead than tin. Typical formulas for the purpose run in the neighborhood of 40 parts tin to 60 parts lead.

Solder formulas are simple, but making good solder requires skill and experience, even if the solder consists of nothing but pure tin and pure lead. The heat at which it is mixed and poured into the moulds, the amount of stirring and even the nature of the fuel used to heat the kettle may effect the quality of the finished product.

There is no reliable rule of thumb test that will accurately determine the quality of solder. The skill and facilities of a chemist and metallurgist are required. The safest rule, therefore, is to buy solder made by a reliable company and whose name on solder is a guaranty of uniform quality, not only in regard to the proportion of lead and tin, but also to the facilities and the care and skill employed in alloying the metals.

Scraps Unsatisfactory

Solder made by the user from scraps of tin and lead is seldom satisfactory because only the well-equipped solder manufacturer is capable of refining metals properly, and of removing dirt, copper particles, iron and steel filings, and other impurities that creep in. It is better to junk questionable solder than to use it and afterwards have trouble with the joints where used.

Cablemen often use 50-50 solder and reduce it with lead sheathing removed from the cable to suit his own individual preference. Telephone engineers and cablemen have realized for a long time the amount of trouble that wiping solder compounded under this method has caused. It looks all right, checks all right before wiping the joint, and after the joint is wiped it appears perfect, but later on when the joint develops trouble, it proves to be the result of defective solder.

The use of nitrogen in cables is convincing more engineers every day of the necessity of only using the finest wiping solder, with the correctly proportioned amounts of tin and lead. Trouble in cross country cables due to defective wiping solder, is resulting in very close supervision, investigation and checking up of solder used in such installations.

Solder Temperature

Testing of splices with nitrogen is also showing up another lame spot in wiped joints, that much of the joint trouble is caused by using solder that is not heated to the correct temperature while wiping the joint. Regardless of how perfect the wiping solder may be, unless the temperature is correct the joint will show defective under test with nitrogen or later mechanical trouble will develop after subjected to service. Up to now there has been no way to test the temperature of wiping solder out on the job, other than the use of a twist of paper dipped into the metal. There is now being marketed an instrument which is advertised in this issue of Telephone Engineer, that eliminates guess work in heating solder for wiping joints.

It is a known fact that solder will not stick without a flux, but even old solder users would hem and haw if you pinned them down and insisted on knowing just what the flux does. When heat is applied, the natural tendency is for the surface of the metals to oxidize instantly. The oxide forms a thin coating that prevents the solder from getting into contact with the metal that is to be joined. In order to prevent the oxide from forming or in order to dissolve it, in case it should form, the parts to be soldered must be coated with some chemical, and this is known as the flux. There are various fluxes in use. A mixture of zinc chloride and sal ammoniac is a very common one. Rosin is also used. Even tallow candles may serve the purpose.

Foreign Substances

There are some characteristics relative to foreign substances in solder that should be mentioned.

Excess of Antimony. A small amount of antimony is mixed in some solders to give brightness. Frequently so much antimony is used that the solder becomes hard and brittle and loses much of its strength.

Zinc. When zinc is present in solder, it can be detected by the sluggishness of the molten metal, by irregular waves and lumps on the surface and by a dull, yellowish white color. The slightest percentage of zinc will make the solder worthless.

Copper. Copper to the extent of one-twelfth of one per cent will not injure solder but more than that will make it absolutely worthless. Copper in solder makes the molten metal unusually sluggish.

Iron. The effect of iron in solder is the same as that of copper. Iron will also cause dark streaks and smears.

Sulphur. Sulphur can be detected by its odor and by the dull surface it produces.

Other Foreign Substances. Bismuth, mercury and cadmium mean decreased strength, and lower the melting point of the solder. Mercury destroys the cohesion of solder and makes working difficult. Arsenic makes solder brittle. Phosphorus makes solder too liquid.

Cleaning Solder

Solder defects are by no means uncommon. The solder is, of course, not always defective by intention, for, as stated before, the greatest skill and special equipment are required for solder making. There is a great deal more to the process than mere mixing. The metals themselves must be refined and refined until they are free from impurities, either in the way of foreign metals or of dirt.

There are times when wiping solder can not be junked but has to be cleaned and used, especially under emergency conditions. It is recommended by many authorities that when impurities have gotten in and the solder's working quality is poor, to:

First. Raise the temperature to about 800 degrees F. (The metal shows dull red in a dark room.)

Second. Throw in some sulphur and rosin. Stir and skim.

Third. When it has cooled somewhat add some tallow which liberates much of the sulphur.

Fourth. Bring the solder to the desired fineness by the addition of block tin as required.

SHEFFIELD GETS KELLOGG BOARD

The enterprising town of Sheffield, Pennsylvania, recently was introduced to an improved type of modern magneto service when the Home Telephone company cut its new Kellogg switchboard into service.

A rapidly growing town, Sheffield is kept both busy and prosperous by a number of industries as well as agricultural pursuits. Mr. A. M. Gibson, owner of the company, says that in keeping with the town's progressive spirit, the Home Telephone company is constantly striving to better its service and keep subscribers pleased. The new No. 50 magneto switchboard equipment installed at Sheffield was purchased from Kellogg Switchboard and Supply company, Chicago, Illinois.

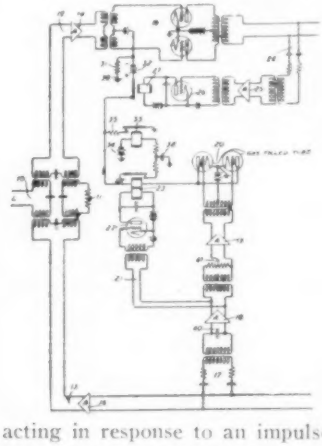
The Latest Telephone Apparatus Patents

A Description of Outstanding Patented Inventions on Telephone, Amplifying and Acoustics as They are Granted by the United States Patent Office. This information Will be Found a Handy Reference for Inventors, Engineers and Plant Men in Establishing Dates of Record, Etc.

Conducted by
BEN. J. CHROMY
Patent Attorney
Washington, D. C.

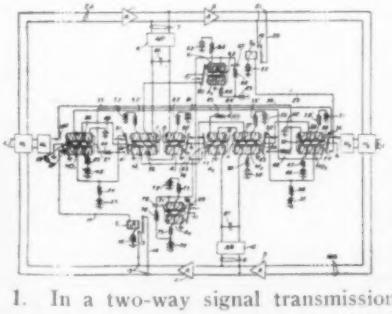
1,880,714. GAS-FILLED TUBE CIRCUITS. Bjorn G. Bjornson, New York, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a Corporation of New York. Filed June 20, 1930. Serial No. 462,500. 11 Claims. (Cl. 179—170.)

1. The combination with a load circuit to be operated of a gas-filled electric discharge device and an auxiliary control, an input circuit common to both, means for operating said load circuit under control of either said device or said auxiliary control, said gas-filled de-



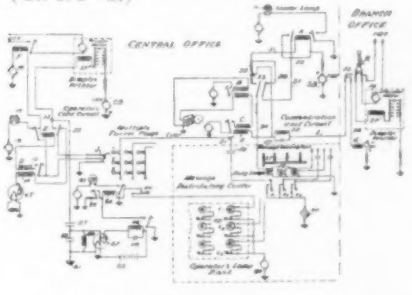
vice acting in response to an impulse in said input circuit to initially operate said load circuit, said auxiliary control acting to maintain the load circuit in operated condition under control of said input circuit.

1,880,715. TRANSMISSION CONTROL CIRCUITS. Bjorn G. Bjorson, New York, N. Y., and Artur W. Horton, Jr., East Orange, and Andrew C. Norwine, Passaic, N. J., assignors to Bell Telephone Laboratories, Incorporated, New York, N. Y., a Corporation of New York. Filed Sept. 10, 1930. Serial No. 480,940. 11 Claims. (Cl. 179—170.)



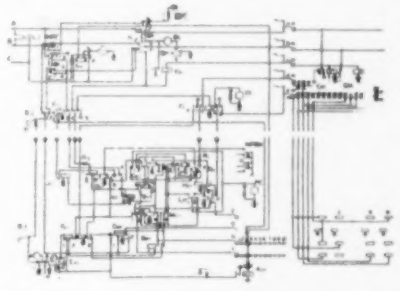
1. In a two-way signal transmission system, two one-way signal transmission paths for transmitting the signals in opposite directions in said system, means connected to each path and responsive to signal transmission therein effectively to disable the other path, and means for varying the sensitivity of both of said disabling means to operation in accordance with the amount of noise in the particular one of said paths in which the noise is a maximum so as to maintain at all times said disabling means in the most sensitive condition possible as regards operation by signals while preventing false operation by noise.

1,880,724. METHOD OF LOCATING AN OPERATOR WORKING ANY LINE. William B. Blanton, Westfield, N. J., assignor to Western Union Telegraph Company, New York, N.Y., a Corporation of New York. Filed Sept. 21, 1931. Serial No. 564,212. 9 Claims. (Cl. 178—2.)



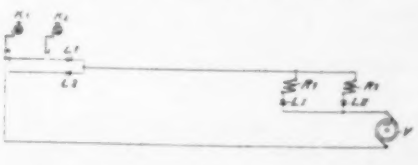
1. In a telegraph system including lines extending from a plurality of branch stations and terminating in multipled jacks or plugs at a central station, a message distributing center at said central station adapted to receive messages for transmission over said lines, a receiving equipment at the central station for each line comprising a busy signal operated upon the seizure of the line, a plurality of printers at the central station each provided with a cord circuit adapted to be connected with any of said jacks or plugs, a signaling device operatively connected to each cord circuit and manually controlled means located at the distributing center for causing the operation of the signaling device in any cord circuit connected to a busy line.

1,886,065. AUTOMATIC TELEPHONE SYSTEM. Charles Edward Stevens and Johannus Cornelis Schooneman, Antwerp, Belgium, assignors to International Standard Electric Corporation, New York, N. Y., a Corporation of Delaware. Filed Sept. 8, 1930, Serial No. 480,460, and in Great Britain Oct. 9, 1929. 22 Claims. (Cl. 179—18.)



1. In a telephone exchange system the combination of a plurality of selector switches, a plurality of lines divided into groups and terminating in contacts of said selector switches, a control switch, means for transmitting digit impulses to said control switch, means under control of said control switch in response to two digit impulses to cause one of said selector switches to advance, first to a group of lines and then to a line within said group, comprising electrical connections between contacts in the selector switch and said control switch to which marking potentials are applied.

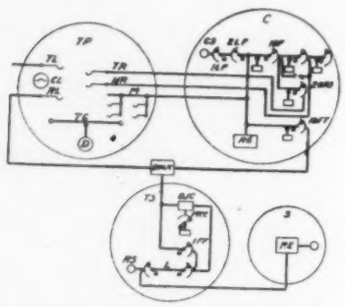
1,886,216. ELECTRICAL SIGNALING AND OPERATING CIRCUIT. Nils Emil Nilsson, Stockholm, Sweden, assignor to Telefonaktiebolaget L. M. Ericsson, Stockholm, Sweden, a registered Company. Filed June 18, 1930, Serial No. 462,106, and in Sweden June 21, 1929. 4 Claims. (Cl. 179—16.)



2. In a circuit arrangement for alternately actuating two relays included in a line loop by means of currents of determined directions, devices consisting of two unidirectional resistances included in said line loop for sending operating currents and adapted to control said relays by converting alternating current to direct current of the one or the other direction, means to associate said uni-

directional resistances parallelly with each other to the line loop so as to block current in different directions, and relay means to actuate said sending devices.

1,886,097. AUTOMATIC TELEPHONE SYSTEM. William Hatton, Antwerp, Belgium, assignor to International Standard Electric Corporation, New York, N. Y., a Corporation of Delaware. Filed Sept. 20, 1930, Serial No. 483,233, and in Great Britain Oct. 16, 1929. 7 Claims. (Cl. 179—27.)



1. In a telephone exchange system the combination of a main exchange and a satellite exchange, an operator's position, automatic switching mechanism at each exchange provided with banks, a junction line extending from the satellite exchange to the main exchange terminating in two branches, one leading to the operator's position and the other leading to the banks, and means whereby calls can be extended over each branch.

RECEIVER TAKES CHARGE OF S. I. TELEPHONE CO.

The Southern Indiana company operates thirty-four exchanges in sixteen Indiana counties, Jackson, Jennings, Knox, Lawrence, Orange, Scott, Washington, Green, Owen, Martin, Daviess, Jefferson and Clark. The company has more than 11,000 subscribers.

The action for receivership was filed by the Middle Western Telephone company of Chicago, owners of the common stock, of the southern Indiana utility. The Middle Western company avered that it had come into possession of the common stock of the Indiana utility as result of the company's failure to redeem the stock which had been posted as collateral for a $31,000 loan about six months ago.

Interest payments of the Southern Indiana Telephone and Telegraph company on $1,100,000 of 6 per cent gold bonds went into default when the owners of the compnay confessed to the court an inability to meet approximately $33,000 in payments due Dec. 1.

Increase Your Revenue with Burglar Alarm Systems

By W. C. DILLON

Mr. Dillon Is a Well-Known Engineer in the Burglar Alarm and Chemical Warfare Gas Protection Field, Having Equipped More Than 5,000 Banks with These Systems

During the past ten years there has been a constantly increasing demand for burglar alarm protection for stores, factories and banks, including hold-up protection. During the present winter the demand has reached proportions beyond any demand of the past. With more than an estimated 14,000,000 unemployed men in this country, thousands at starvation point, the demand for burglary protection is obvious.

Telephone companies are the logical people to install and service burglar alarm systems. With proper equipment and installation they form a good revenue producer for the telephone company.

Many companies have "played around" with the installing and servicing of alarm systems and have found that their relays, door and window contacts, etc., were not efficient. The American District Telegraph company with all its years of experience, continues to experiment with new and improved alarm circuits and equipment for burglary protection of commercial firms. In view of this fact, it is doubtful that local telephone companies can build successfully these systems from their supplies of equipment. The writer has had considerable experience with telephone company installations and that is the basis for the above remarks.

Proven alarm circuits and equipment, which gives maximum service for minimum cost and with which to equip any kind and class of business house can now be purchased by telephone companies. They include local (within the building) alarms that ring a bell, systems which pass a signal direct to the local police station and systems which include alarm switchboards at the telephone exchange. Chemical warfare gas systems also may be connected up with such installations so that they are released when an alarm is sounded. The system which produces the most revenue for the telephone company is the one in which the alarm switchboard is placed in the exchange.

A burglar alarm system must be foolproof against trouble, and so designed that if wires are short circuited, opened or grounded, the alarm will operate.

Telephone companies are in a better position to merchandise burglar and hold-up alarm protection systems than any other organization. They have the facilities such as room space for alarm switchboards, electrical equipment, sufficient office help, installers, trouble men, salesmen, advertising men and in fact everything that is needed to carry on such a business.

This type of service has been known to many in the telephone field, but they have not capitalized or cashed in on it for the following two reasons:

First, they are not acquainted with alarm circuits or equipment or do not have the information as to where to purchase equipment, and, second, the policy of a majority of telephone operating companies has been to just accept that business that comes in over the counter voluntarily and not to go out after new revenue producing business. It is a known fact today that to operate a profitable business new revenues must be stimulated at all times.

Installation and servicing of alarm systems is one of the surest ways to increase business and it so happens that now is the psychological time to put it into affect.

KANSAS UTILITIES RATE CUT URGED FOR GOOD WILL

Topeka, Kas.—Public utility companies in Kansas, described as having granted no rate reductions "during the depression," have been asked by the state public service commission to make voluntary temporary rate cuts for 1933.

"In our judgment it would pay your company in good will to make this temporary reduction even though it was done at a sacrifice," the commission's letter says. "It might be necessary for your company to forego dividends for a while, to again cut expenses, and set aside lesser amounts for depreciation and surplus."

THE TECHNICAL CLEARING HOUSE

B. C. BURDEN, Editor

Ohm's Law and Power Equations

Q. Please explain Ohm's Law and also the equations dealing with power.

A. Ohm's Law states the quantitative relation which exists between the volt, ohm, and ampere. It is the most useful of all electrical laws. Ohm's Law is defined as follows: "THE INTENSITY OF CURRENT IN AMPERES IN ANY ELECTRICAL CIRCUIT IS NUMERICALLY EQUAL TO THE POTENTIAL IN VOLTS IMPRESSED ACROSS THE CIRCUIT, DIVIDED BY THE RESISTANCE OF THE CIRCUIT IN OHMS."

This law is expressed in equation form as follows:

$$I = \frac{E}{R}$$ Where: I—amperes, E—volts, R—ohms

If the current and resistance are known and it is desired to find the voltage causing this current to flow, the following equation applies:

$$E = IR$$

If the voltage and current are known and it is desired to find the resistance, the following equation should be used:

$$R = \frac{E}{I}$$

The following three examples illustrate the use of Ohm's Law:

No. 1—What current will a 50 ohms transmitter draw when connected to a three volt battery?

$$I = \frac{E}{R} \quad \text{and} \quad I = \frac{3.0}{50} = .06 \text{ amperes.}$$

No. 2—What is the resistance of an electric light which will allow 1.0 ampere to flow through it when connected to a 110 volt source.

$$R = \frac{E}{I} \quad \text{and} \quad R = \frac{110}{1.0} = 110 \text{ ohms.}$$

No. 3—What voltage will be required to force 1.0 ampere through a telephone receiver having a resistance of 75 ohms?

$E = IR$ and $E = 1.0 \times 75 =$ volts.

It is important to note that while Ohm's Law applies to both direct and alternating current circuits, its application in connection with AC circuit is somewhat different than just described for DC circuits, in that the impedance of the circuit must be taken into account and not merely its ohmic resistance.

With regard to the power equations they are based on the law governing the power in an electrical circuit. This law is as follows:

"THE PRODUCT OF THE CURRENT IN AMPERES FLOWING IN A CIRCUIT TIMES THE POTENTIAL IN VOLTS OF THE CIRCUIT WILL GIVE THE POWER IN WATTS EXPENDED IN THE CIRCUIT."

The basic equation for the computation of power is:

$P = I E$ Where: P—watts, I—amperes, E—volts

Like Ohm's Law the above basic equation may be transposed so that if any two of the terms are known, the third may be found. That is:

$$I = \frac{P}{E}$$ Equation for finding the current when power and voltage are known.

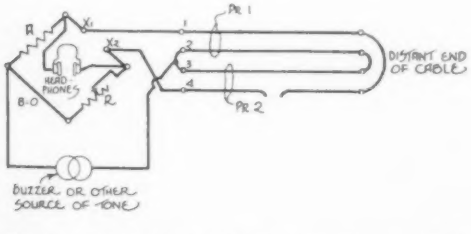


Fig. 1. Schematic of Murray set-up for locating open faults in cable.

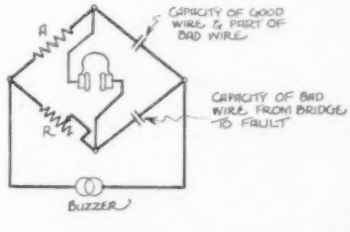


Fig. 2. Theoretical circuit formed by Wheatstone Bridge in set-up shown by Fig. 1.

$$E = \frac{P}{I}$$ Equation for finding the voltage when power and current are known.

The following three examples illustrate the use of the three power equations:

No. 1—What is the power consumed by a telephone transmitter connected to a three volt source, and through which there is 0.2 ampere flowing?

$P = I E$ and $P = 0.2 \times 3.0 = 0.6$ watts.

No. 2—A motor is rated at 500 watts and 250 volts, what current will it draw from the line?

$$I = \frac{P}{E} \quad \text{and} \quad I = \frac{500}{250} = 2.0 \text{ amperes.}$$

No. 3—What voltage will be required to force 5 amperes through a 100 watt light?

$$E = \frac{P}{I} \quad \text{and} \quad E = \frac{100}{5} = 20.0 \text{ volts.}$$

There are two other equations which are used in computing power and these are of particular importance in connection with transmission computations in the telephone field. They are:

$P = I^2R$ Equation for finding the power when current and resistance are known.

$$P = \frac{E^2}{R}$$ Equation for computing the power when voltage and resistance are known.

The following examples illustrate the use of these two equations:

No. 1—The current flowing to an electric light is 2.0 amperes and the light has a resistance of 50 ohms, what power does it consume?

$P = I^2R$ and $P = 2^2 \times 50 = 200$ watts.

No. 2—If 100 volts is impressed across a resistance of ten ohms, what power will be consumed?

$$P = \frac{E^2}{R} \quad \text{and} \quad P = \frac{100^2}{10} = 1000 \text{ watts.}$$

Location of Opens in Open Wire and Cable

Q. Can the Wheatstone Bridge be used for locating opens in open wire or cable?

A. The Wheatstone Bridge can be used to locate opens in open wire or cable although it is not possible to get as precise results as can be obtained in the location of grounds and shorts.

The recommended method of locating opens consists in using the A and R arm of the Wheatstone Bridge in a "Murray" arrangement as shown in figure 1.

A good pair of wires in the same cable as the pair having an open conductor is required and the good and bad pair are connected to the X arm and the ground terminals on the bridge as shown. The switch on the bridge is thrown to the Murray position.

The good and bad pairs are strapped together at the distant end of the cable. A pair of headphones should be connected in place of the galvanometer, and buzzer or other suitable tone source connected in place of the battery. Cut

1000 ohms (M-1000) into the A arm of the bridge.

Next balance the R arm of the bridge so that no tone is heard in the receivers. Under this condition the resistance of the A arm is to the resistance of the R arm, as the capacity reactance of the good pair plus that portion of the bad pair from strap to fault is to the capacity reactance of the portion of bad pair from fault to bridge, thus satisfying the fundamental Wheatstone Bridge equation.

After balancing the bridge, the distance from the bridge to the open can be determined by the following equation:

$$X = \frac{2LA}{A+R}$$

Where X—distance to open in feet.
L—total length of cable in feet.
A—Murray setting in Ohms.
R—Rheostat setting in Ohms.

Figure 2 shows schematically the theoretical circuit formed by the good and bad pairs and the Wheatstone Bridge.

Book Review

"COMMUNICATION ENGINEERING" ISSUED

A new book, "Communication Engineering," by W. L. Everitt, associate professor of Electrical Engineering of Ohio State University, was issued recently.

The book presents a thorough, fundamental treatment of communication engineering, new in viewpoint and angle of approach, and covering telegraph, telephone and radio activities. Because simplifying assumptions, which can be made in a system that operates at a single frequency, cannot be made when a band of frequencies is employed, the author has emphasized general, rather than specific applications.

Following are the topics covered in the eight sections of the book: introduction and classification of impedance elements, networks using linear bilateral impedances, networks using unilateral impedances, networks using non-linear impedances, negative resistance effects, coupling between electrical and mechanical circuits, coupling between electrical circuits and free space and electrical measurements.

PORT ARTHUR TELEPHONE CO. ELECTS DIRECTORS

The annual meeting of the stockholders of the Port Arthur Telephone company, Port Arthur, Texas, was held at Dallas, December 5. The following directors were chosen for this year: C. C. English, C. A. Gates and P. K. Higgins.

The board of directors elected the following officers for the year: president, P. K. Higgins; vice-president, C. A. Gates; secretary, H. D. McBride; treasurer, R. A. Nickerson, and assistant secretary, W. R. Faught.

TELEPHONE EMPLOYEES CUT THEIR OWN PAY

Employees of the Merchants' and Farmers' Telephone company, which operates in upper Hanover County in the Montpelier and Beaver Dam sections of Virginia, voluntarily have offered a salary reduction for themselves and at a meeting of the board of directors of the company the rates both to private homes and business houses will be reduced. C. Walton Saunders of Ashland, president of the telephone company, states the new rates will mean an expanison of the service and that more users will avail themselves of the present low cost of service.

DESIRES TELEPHONE WORK IN FOREIGN COUNTRY

TELEPHONE ENGINEER has had a communication from a telephone man desiring work in foreign countries. The applicant has had fifteen years' general telephone experience and is interested in securing a contract with an American company operating in foreign countries.

Any company desiring further information may write to B. H. B., care of TELEPHONE ENGINEER.

HINCKLEY OPERATOR STICKS TO SWITCHBOARD DESPITE MENACE OF FLAMES

Sticking to her switchboard in a smoke-filled room while flames crackled near-by, a woman telephone operator spread the alarm when fire broke out at 2 a. m., summoning firemen, calling for outside aid and arousing occupants of the flaming structure.

The blaze wiped out the telephone exchange and four other business places housed in a two-story brick building in the center of town. Loss was estimated by firemen at between $40,000 and $50,000.

The heroine of the fire was Miss Mary Spry, chief operator. She was at the switchboard, on the second floor of the building, when Donald Kindred, 17, noticed flames licking through the ground floor of the candy kitchen. Kindred notified the operator.

First rushing to the apartments where Mr. and Mrs. Isadore Wendt and William Rinesmith, another telephone operator, were sleeping, she aroused them. Returning to the switchboard room, now filled with smoke, she rang the fire alarm and phoned the Pine City fire department for help. She finally was forced to abandon her post and rush to the street when the flames threatened to cut off her escape.

ENGINEERING — MANAGEMENT COURSE

(*Continued from page* 14)

electro-magnets and the release mechanism.

From a study of the illustration it will be apparent how the wipers are moved up and around to make connections with any desired pair of contacts. The wiper springs and connecting wires serving much the same function as the switchboard plug and cord in a manual exchange.

The selectors and connectors in an automatic exchange are analagous to the cord circuits in a manual exchange, i.e., they are common to all subscribers' lines. The number required to serve a given number of subscribers' lines will depend on traffic but as a rough rule we can assume 10% as many selectors and connectors as subscribers' lines.

The February issue will continue the discussion of the basic theory of each type of automatic system.

TELEPHONE MAGAZINE IS PRAISED

That the Lincoln Telephone and Telegraph company of Lincoln, Nebraska, is doing a good job in publication activity is shown by the following statement in "The Business Journalist."

"Lincoln Telephone News, Lincoln, Neb. — For a four-page paper yours leaves very little room for improvement. It is nicely made-up, well printed, and easy to read, which are very desirable qualities."

COMPANY TELLS EMPLOYEES HOW TO SELL BY TELEPHONE

Many companies are promoting sales by telephone through instruction to employees as to how to conduct conversations over telephone instruments. Among them is the Tennessee Electric Power Company. "The Business Journalist" has the following to say about an article appearing in the house organ published by the Tennessee company.

"In an article, 'Personalizing Our Telephone Contacts,' *Electric Topics*, Tennessee Electric Power company, outlines the fundamentals in using the telephone. Since it is an important medium of contact with customers it is imperative that employes know how to use the telephone courteously and without irritation to the customer. This is a good subject for a house magazine article."

Increase operating revenues *with* TELETYPE

Good prospects for Teletype service include:

Air Lines
Banks
Cab Companies
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Mines
Newspapers
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Police Departments
Printers
Railroads
Textile Mills
Wholesalers

"How to boost 1933 revenues?"... that question is of utmost importance to every telephone company. One practical answer is, "Sell Teletype service to prospects in your territory."

Present conditions make this a *good* time to sell Teletype. Teletype *cuts costs for users*—helps them to solve one of their most pressing problems!

Teletype speeds up communication between distant offices or between departments in the same building. It eliminates duplication of effort in copying, makes for increased accuracy, handles many kinds of form work more efficiently. Small concerns as well as large have found Teletype well nigh indispensible.

Make a study of your local business concerns. Our sales engineers will gladly assist you in adapting Teletype service to their needs.

Write today for full details and illustrated literature describing Teletype installations, to the Teletype Corporation, 1400 Wrightwood Avenue, Chicago, Ill.

TELETYPE

SUBSIDIARY OF

Western Electric Company

Looking at Both Sides of the Question Squarely in the Face

By F. A. BOWDLE

The following conversation took place on the streets of a small Illinois village not so long ago.

"Well, hello there Mr. (Telephone Man). I was just on my way over to your office to pay my telephone bill. Don't know how much longer I can keep it up though.

"Howdy John, that's fine. I'll walk along with you. Suppose everything on the farm is running along as usual?

"No, not so good. You know that I am having an awful time keeping even with the world now-a-days. If it wasn't for the wife's chickens, butter and eggs that we can trade for sugar and coffee, we would be on the county.

"Yes, John, I know things are bad, but, you know they could be worse. You had a bumper crop of corn this fall, to say nothing of your wheat and oats. Of course, I know prices are low and taxes are high.

"I'll say they are. What do you think I was offered for my new crop of corn? They had the nerve to give me 14 cents a bushel, shelled and delivered to the elevator here. Ain't that highway robbery for you? I had a small load of wheat left and they said they would give me 34 cents if I brought it in. I told them I would grind it up and eat it myself first.

"Well, John, I'll say you are lucky if you can do that. I have to pay the long sum for any cereals I eat.

"We are not going to starve, I guess, but some things are way out of reason. Now take your telephone rates for instance. We farmers ought to take our phones out.

"John, if all our subscribers thought as you do we would just have to quit. In the first place, I could not pay our operators and linemen and I would be forced to close up the office and that would mean that there would be no more telephone service in this community. If I closed up the exchange, how could you get the doctor or veterinary in case of emergency some cold night?

"I guess you are right at that. Between you and me I had that very thing brought home to me very forcibly just a few nights back. Before going to bed, I went out to see if all was well with the stock. I found one of my best mares down with a bad case of colic. I phoned for Doc Wright but he was not home. Pearl, the telephone operator, (say, there's a good operafor for you) finally located him for me down by Oakley. He got here in about 30 minutes and soon had the horse up. Doc told me if he had been 30 minutes later he did not think he would have saved her. I've been offered $200 for that mare, and as much as I have cussed that phone, I sure appreciated it that time. And you remember that time last summer when Adams' house caught fire, and the Mrs. called neighbors and they got there in time to put it out before it had done much damage. No, I am not going to take my phone out, forget about it. It has saved me lots more than it costs me.

"Yes, all you have said is very true, John, but some of your neighbors like to tell me that they can get quicker action with their autos.

"That might possibly be true in a few instances. But take this case when I called Doc Wright. If I had gone after him in my auto, I'd have driven six miles to town and then after some delay, ten miles out to where he was and then back home, or about 12 miles. That would have meant that the mare would probably have been dead. That's what some of those fellows are up against that have had their phones taken out. Most of them have already spent more money on gas than their phones would have cost them.

"Of course, John, that's the way I look at the matter too. If I could get all of the fellows to look at things the sensible way you do I believe my troubles would be over. Now you may not know it but we telephone men are working under strict state and national government regulations and our rates have been down to the very lowest minimum of return by the utility commissions, and if we lose very many phones it means that our stockholders, a good many of them of whom are men just like yourself, won't get any return on the money they have invested in this community enterprise. By the way, any time you are interested in looking over our financial statement let me know and I will take all the time you want and go over them with you. We are a public utility and we haven't anything to hide or cover up.

"Well, that's nice of you, Mr. ———, maybe I'll do that some day. You know I can't get along without my telephone and of course I was just joking about having it taken out. Here is the money, guess while I'm here I'll pay for a couple of months in advance. You know I think this little talk has done both of us a lot of good. Well, so long, and say, we are going to butcher some hogs in a few days. I'll call you up and you can come out and I'll give you some tenderloins."

NO SERVICE, HE SAYS; SUES PHONE COMPANY

A suit for $25,000 damages was filed at Pomeroy, Ohio, against the Ohio Standard Telephone Company by Charles F. Davis, broker, who charged that the company failed to give him service. The action ruined and forced him out of business, Davis alleged.

LOWER RATES APPROVED

Schedules of reduced telephone rates filed by the Tompkins Telephone company, Werner, and the Home Improvement company, Crystal, North Dakota, have been approved by the state railroad commission.

PHONE OFFICES TO CONSOLIDATE

The business offices of the former Farmer Telephone Co., which was consolidated about a year ago with the Sidney Telephone Co., were moved to the main office of the company in the Telephone building on North St. at Sidney, Ohio.

Announcement is made that the Farmer accounts will be kept separately until the main cut-over is made between the two lines, and the Farmer's transferred entirely to the Sidney company lines. This cut-over will probably be made during the early part of the new year.

CERMAK EXPLAINS WHY WOMEN EXCEL ON 'PHONE BOARDS

CHICAGO — The female of the species has a quicker tongue and more receptive ear than the male, Mayor Anton J. Cermak explained recently in announcing that 80 men telephone operators in the police department will be assigned to beats, with women supplanting them at the switchboard. The mayor said women have quicker reflexes than men and, therefore, a girl telephone operator will receive and relay a report faster.

For the Small Exchange—
The Completely Self-Contained C.A.X.

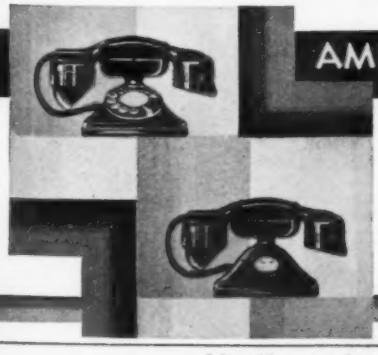
THIS C.A.X. has been designed for small suburban or rural exchanges desiring to combine THE FINEST TYPE OF SERVICE OBTAINABLE with low operating cost and exceedingly low capital investment.

An AUTOMATIC ELECTRIC PRODUCT

It represents the last word in full automatic service—yet it uses proven, time-tried switching units at a price the small exchange owner can afford to pay.

These C.A.X. units are fully self-contained and compact. They can be used with either magneto or central battery telephones, and with grounded or metallic lines. C.A.X. exchanges require NO OPERATORS AND NO ATTENTION.

Studies will be submitted promptly upon receipt of brief information on your properties.



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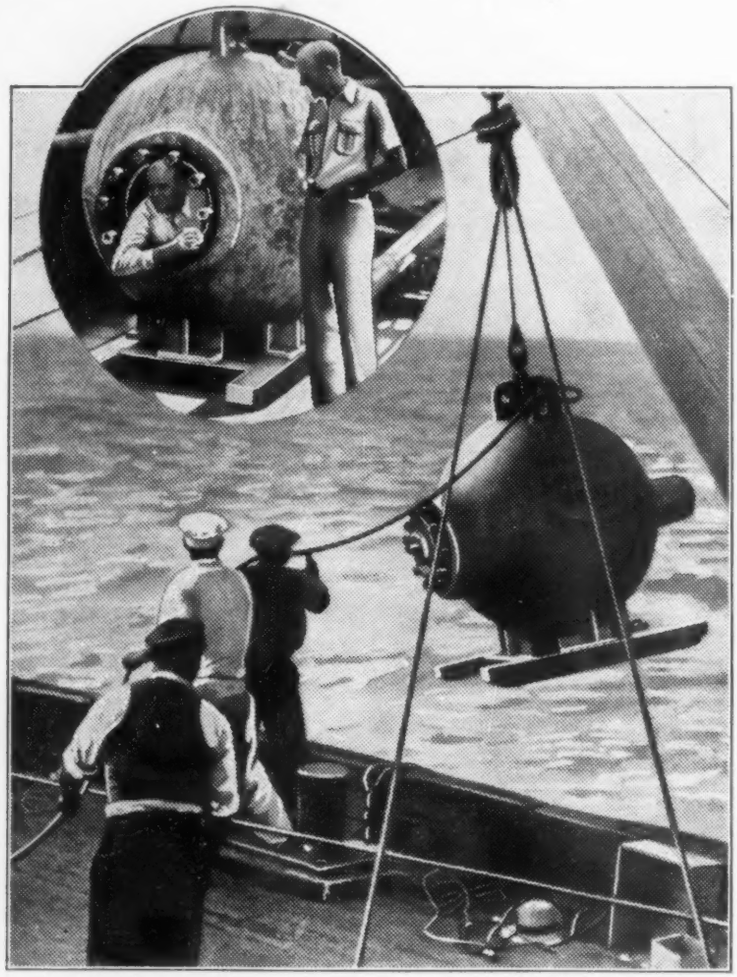
Scientist Submerged in Bathysphere Broadcasts From Atlantic's Depths

While dangling in a steel ball nearly half a mile below the surface of the Atlantic Ocean off Nonsuch Island in the Bermudas, Dr. William Beebe, the New York Zoological Society's famous ocean explorer, spoke to the audiences of fifty-two NBC radio stations not long ago. Employing a telephone set like those now being used by the operators in central offices, he gave radio listeners a detailed description of his passage to the ocean's depths.



Wide World Photos

Steel ball containing Otis Barton, its inventor, and Dr. William Beebe, on its way down to nearly half a mile below the surface. Inset: Mr. Barton in bathysphere, Dr. Beebe beside it.

Soon after he and his companion, Otis Barton of the American Museum of Natural History, the inventor of the steel ball, called a bathysphere, had been securely sealed in the globe and were on their way downward, Dr. Beebe reported that the ocean water was as "black as Hades." Shortly after, however, when they reached a depth of about 1,500 feet, he declared that fish were swimming about under their own light. At 1,750 feet, he said the number of lighted fish had increased and at 1,900 feet, he exclaimed that everything was "lit up."

Talk With Tug Is Broadcast

Down another hundred feet, the scientist, who has been a student of deep-sea life for years, was astounded by what he saw. At one point he reported seeing "loads of little—I don't know what they are; I never saw anything like them." Here the progress of the bathysphere was halted while the naturalists made pictures of the strange forms in front of them. Radio listeners heard the clicking of their cameras.

The broadcast was a conversation between Dr. Beebe, in the bathysphere, and his secretary, Miss Gloria Hollister, on the Freedom, the tug boat from which the ball was suspended. During the dive, Dr. Beebe made continual requests to the men in the tug boat to lower the bathysphere still farther. When the ball had reached a depth of 2,200 feet, Dr. Beebe reported that the ball was "rolling like the dickens." This was caused by the sea on the surface which was tossing the tug. Soon after, as the rolling continued, the order was given to haul the bathysphere to the surface.

Before Dr. Beebe made his spectacular dive of 1930, when he went down to a depth of a quarter of a mile, he inquired of the Bell Telephone Laboratories as to what type of telephone equipment would be best to use between the bathysphere and the surface. The Laboratories presented him with two sets incorporating a new operator's transmitter which is now in use in telephone central offices.

Pressure of Nearly 5,000 Tons

The transmission element in these transmitters is the same as that in the lapel microphone which was such an important factor in the broadcasting of the political conventions last June. The set is relatively insensitive to stray noises, an essential when used in a hard-wall space such as a steel ball.

The bathysphere itself is four feet nine inches in diameter and weighs 5400 pounds. Its steel walls are about an inch and one-half thick, and entrance to the ball is through a manhole over which is clamped a 400-pound lid. Inside, oxygen is supplied from a tank and chemicals in trays take up the exhaled carbon dioxide gas and the moisture given off by the body. Telephone and electric light wires pass along the supporting cable. At a depth of 2,200 feet, it is estimated that pressure on the ball is nearly 5,000 tons.

A Circuitous Hook-up

The circuit for Dr. Beebe's broadcast was unusual. After his words reached the deck of the Freedom over the telephone wires from the bathysphere, they were sent by radio telephone to the receiving station of the Imperial International Communications, Ltd., near Hamilton, Bermuda. From Hamilton the circuit followed wire lines to the transmitting point at St. Georges, Bermuda, and from there over regular Bermuda radio telephone channel to the American Telephone and Telegraph Company receiving station at Netcong, N. J. From there the circuit led to New York, where the program was supplied to the broadcasting stations over nearly 15,000 miles of program transmission circuits.

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275 ROOMS WITH BATH
$2.00 up

The ANNEX
226 ROOMS WITH BATH
$1.50 Up

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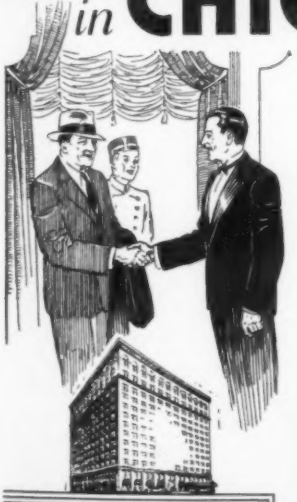
COFFEE SHOP OPEN UNTIL MIDNIGHT

The Homelike Atmosphere in CHICAGO'S LOOP



There's a warmth, a friendly regard for your comfort at Hotel Lorraine that is often lacking in larger hotels. The special food and low prices in our Coffee Shop and Cafeteria will appeal to you. Garage at moderate rates.

ONE PERSON WITH BATH
$1.50 and $2.
TWO PERSONS WITH BATH
$2.50 and $3.

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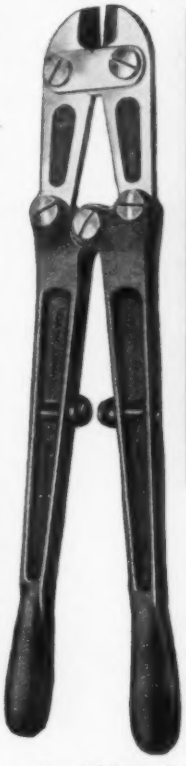
WABASH AT VAN BUREN

It doesn't "mash"..



..it CUTS!

Vacuum Grip BOLT & WIRE CUTTER

Ray Blain, telephone engineer and well known authority on tools, stationed at the office of the Chief Signal Officer, War Department, Washington, D. C., sends us the above photograph of Vacuum Grip No. 14 Bolt Cutter, with the following comments:

"Today, when the cutters arrived, we were assembling a new main frame, and had a number of bolts to cut off. All the men were surprised at the ease with which the bolts could be cut. Your tool cuts the bolts clean off, whereas most cutters cut half way thru and then mash the rest off. Vacuum Grip Bolt Cutters cut switchboard cables neat and clean, and with far greater ease than any tool I have ever had experience with."

BOLTS — heavy wires — switchboard cables — Vacuum Grip Bolt Cutter shears them *clean*. A true *cut*, thru and thru, *without mashing!* That's only one of the reasons why these wonder cutters have made thousands of friends in the telephone field in one short year.

Blades hammer-forged from *high carbon* electric furnace Molybdenum alloy tool steel. Assembled as one unit, replaced by means of two set screws. Handles, alloy tool steel instead of easily broken cast steel. Most powerful bolt cutter made.

NO. 114— LINEMAN'S SPECIAL—LENGTH 14"

Cutting capacity 5/16"—equal to any 18" cutter on the market. Light in weight, easily carried in belt. Complete with side-cut blades, $4.00. With centre-cut blades for hard as well as annealed wire, $4.25.

Also in 18" and 24" sizes. All sizes may be had with side-cut, end-cut, diagonal-cut or centre-cut blades.

Purchasing Agents: Write for full particulars. Or order a few pairs for try-out purposes.

FORGED STEEL PRODUCTS CO., NEWPORT, PA.
Manufacturers of

Vacuum Grip REG. U.S. PAT. OFF. Pliers

Built UP to a Standard- Not DOWN to a Price

NEARLY A MILLION IN USE

News From the Field

The Southwest Telephone company constructed a metallic toll line from Erick to Texola, and made other improvements at a total cost of $18,000.

Southwestern Associated Telephone company installed a new exchange at Arnett.

The Butler Bremer Mutual Telephone company directors voted to completely rebuild the town lines in Plainfield, Iowa, this coming summer. Overhead cable will be used on Main street and underground cable in the west part of town.

The meeting was called to order by President S. B. Whitney with 37 present and 8 absent. Henry Thompson was unanimously reelected manager for the coming year.

Reports show that the company is in better financial condition than for some time past.

Buchanan, N. Y., a village of 1,400 persons on the Hudson River, was cut off from communication when a tenement house fire burnt out 60 feet of telephone cable, containing 100 trunk and 300 local lines, on the Albany Post Road.

The telephone truck lines connected New York and Albany.

R. T. Maltimore, district manager of the Illinois Commercial company who has been located in Monticello, the past nine months, has been transferred to Tuscola, Ill. Ten more exchanges have been added to the district.

W. W. Latham was granted the right to purchase the Walnut Grove, La., telephone exchange from the Southern Telephone company by the rail commission.

E. L. Dexter, who was manager of the Merrill, Wis., telephone exchange until his promotion to district commercial agent at Eau Claire, has received the service emblem award from the Wisconsin Telephone company for completing twenty-five years of service.

The largest personal property taxpayer in Macon county, Ill., is the Illinois Bell Telephone company, which next spring will be taxed on an assessed valuation of $505,000. This sum is more than double that of the A. E. Staley company, whose $226,000 personal property valuation tops industrial concerns in that county.

A pheasant which became entangled in telephone wires near Belview, Iowa, put a large number of telephone lines south of that village out of commission. Word was received in Redwood Falls that telephone subscribers in the vicinity of Belview were having trouble and a line man was sent out. Near Belview a dead pheasant was found hanging on the wires, causing a short circuit.

Work is beginning on the relocation and replacement of portions of the long distance line of the Wisconsin Telephone company between Ashland and Bayfield, according to Harry C. Mattson, manager of the Washburn and Bayfield exchanges. The changes have been necessary by the recent relocation work on State Trunk Highway 13.

Sections of the telephone toll line south of Washburn and between Washburn and Bayfield will be relocated. An expenditure of approximately $14,500 will be required.

Three sections of the pole line between Marcus and Northport, Washington, are being relocated by the Home Telephone and Telegraph company at a cost of approximately $5300.

"We are spending a lot of money at this time for improvements in the line to keep our workmen busy," said George E. Giffin, division commercial supervisor.

Sam Tomlinson has purchased the Decatur, Indiana, Independent Telephone company. Mr. Tomlinson has been in the telephone business most of his life and was president of the Winona Telephone company.

Mr. and Mrs. W. P. Cox of Hale, Missouri, purchased the Hale telephone exchange from the Citizen Public Service company of Missouri.

The couple formerly operated the Hale telephone exchange. They disposed of it in 1928.

The Illinois Commerce Commission authorized the Illinois Bell Telephone company to: Sell to the Western Union Telegraph company certain conduits and other telephone property in Rockford, for $3,000; purchase from the American Telephone & Telegraph company certain quads and other telephone property in the counties of Marshall, Bureau, Peoria, Tazewell, Mason, Menard and Sangamon for $32,657.47; sell to the American Telehpone & Telegraph company certain conduits in Perry and Jackson counties for $2,539.

Miss Dorothy Disterhoft, chief operator for the Citizens Telephone company has been made traveling chief operator for the Associated Public Utilities corporation. Miss Disterhoft left Tuesday night to take up her new duties. Her headquarters will be at Columbus, Ohio.

Miss Disterhoft has been with the Citizens Telephone company for the past five years, rising from a position as operator to the billing office and for the past two years to that of chief operator. Her promotion is a splendid recognition of the service she has rendered.

R. B. Trent, manager and operator at Columbus, N. M., telephone office, was instantly killed in an automobile explosion. The fatal accident happened at 6:30 o'clock when few were astir in the border village, and it was impossible to ascertain how it occurred.

He was formerly employed at the Columbus railroad station as a telegraph operator for the Southern Pacific company. His daughter, Jewel Trent, is a music instructor at the Radford School for Girls in El Paso.

Automatic Telephone Service Opened in Honduras

Automatic telephone service was inaugurated in Tegucigalpa recently. The new system has not yet been formally accepted by the Government.

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FOR USE
IN COLD WINDY WEATHER

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Powerful flame—2000° F.
Fitted with Orifice cleaner.
Tank of 18 gauge steel.
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HANDSET «» TELEPHONES

LEICH brings a new standard of articulation and transmission efficiency to Independent Telephony.

The transmission of LEICH handset telephones is superior in volume and articulation to the best wall or desk telephones.

A modern design of dignity and beauty

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Booster Type Circuit

Technically Correct — Lowest Prices

The handset is the telephone of the future! Experience has proven its value to hold and obtain subscribers. LEICH handset telephones will modernize your exchange.

LEICH — The premier handset telephone.

CODE NO. 60 used with LEICH No. 8 bell box—1000 ohm ringer.

CODE NO. 62 used with any type of bell box.

Order One and Prove Our Statement

Circular No. 160 gives complete details

Leich Electric Co.

GENOA, ILL.

Identify your inquiry to advertisers by saying—"As shown in TELEPHONE ENGINEER"

RAMBLINGS

By J. A. S.

Rambler took a few days' trip across Illinois and Indiana recently visiting here and there and finding out what was in the air for 1933.

* * *

At Springfield he visited the headquarters of the Illinois Telephone Association, finding Secretary Parsons and Engineer Talmadge, as well as the efficient force, busy in the performance of their duties. Parsons being quite busy, the job of enlightening Rambler was left to Talmadge. Conditions in Illinois moving along as usual but quiet; no disturbances except rate cases, wherein efforts are being made to lower service charges.

* * *

F. R. Brown, vice-president of the Illinois Commercial Telephone company, with headquarters at Springfield, was the next gentleman visited. He stated that take-outs were still showing a tendency to drop and he was hopeful that gains would begin to show early in the year.

* * *

In Illinois it was feared that because of an entire change of administration and the possible replacing of all employees and experts in the commission effecting highways might impose hardships on telephone companies and other utilities throughout the state. With demands galore for reductions in service charges and with a commission unacquainted with conditions as they are today, it was felt that a new commission might be handicapped for at least a year and it was predicted that Federal courts would be appealed to quite often during the next administration.

* * *

At St. Louis we visited T. L. Leonard, manager of the T. L. Leonard Electric company and operator of a number of exchanges in Missouri. Mr. Leonard felt that 1933 was looming more hopeful and that he anticipated his business would begin to expand by spring.

* * *

P. K. Higgins of the Scotia Telephone company, St. Louis, was still on vacation and could not be reached. We noticed that he had been re-elected president of the Port Arthur Telephone company, "way down" in Texas. Higgins has been connected with this organization ever since he lived in Texas, "way back when—".

Other places along thru Illinois evinced a feeling of optimism found lacking on former occasions. No material improvements could be pointed to at this time, but the feeling of the community served was that people were more contented than for some time past.

* * *

At LaFayette, Ind., we found General Manager Cuppy busy directing activities of the Indiana Associated Telephone Utilities company with an earnestness that brought encouragement to the state. Superintendent Brown was braving the rain and snow to keep his work up to a standard. These gentlemen felt that economy was necessary to meet present conditions and that such measures would be followed for some months yet.

* * *

Over at Logansport we found Walter Uhl "out on the job" surveying rural lines and making changes in his territory which would permit service on some of the rural lines being operated with less difficulty and more efficiency.

* * *

It was felt in Indiana that the appointment of Hugh A. Barnhart, son of Henry A. Barnhart, president of the Rochester Telephone company, as director of the Indiana highway commission, will have the effect of easing the minds of telephone men in that state as to what they may expect from highway activities. Mr. Barnhart is acquainted with the problems of the telephone companies in the matter of pole construction along the highways, and it is believed no unnecessary hardships will be imposed upon them the next two years.

JEFFERSON CITY, MISSOURI, OPERATORS BREAK RECORDS

The November 16th issue of the Daily Capital News of Jefferson City, Missouri, paid tribute to the efficient service of the telephone operators and the perfect functioning of the Stromberg-Carlson Super-Service Switchboard during the unexpected wintry storm that covered the city on the afternoon of the fifteenth.

Business in general was at a standstill due to the persistent fall of snow and low temperature but in the telephone exchange records were being broken. Jefferson City people were using the telephone. Between 3 p. m. and 6 p. m. 13,500 telephone connections were completed by 10 operators. 1,350 calls per operator in three hours or an average of 450 calls per position for three consecutive hours is a record of which to be proud.

This record is even more significant when consideration is given to the fact that these were actually completed connections. The exchange equipment at Jefferson City is so designed that no registration of calls takes place until the operator has connected the calling cord either with a subscriber's line or with a busy-back jack and has depressed either the ringing or the release key.

"Our lines held up during the storm," said Manager Foster B. McHenry, "but did they swamp us with calls? We have had one hour periods just as busy but we have never had a continuous three hour barrage of the magnitude of today. The girls worked hard and we tried to maintain the service. We believe we did, thanks to faithful operators."

In 1929 the Capital City Telephone Company installed Stromberg-Carlson Super-Service exchange equipment. The purchase was made after an exhaustive study of all types of central office equipment and it was decided that a modern manual switchboard would furnish the most satisfactory service to their subscribers, provide operating economies that would permit profitable operation at moderate rates, and be sufficiently flexible to take care of unusual loads without surplus equipment that would be used only during emergency periods.

The speed with which calls can be answered through this type of switchboard is not limited to the mechanical performance of the equipment but rather to the operators. While it is not practical or desirable to expect operators to work at such a speed under normal load it is a source of satisfaction to know that in emergencies the load may be greatly increased, even doubled, and still give satisfactory service. This in itself is an operating economy that results in profitable operation because it makes it unnecessary to maintain a surplus of equipment that will be used only in emergencies.

DEPARTMENT OF PHONE COMPANY IS CHANGED

The accounting department of the Illinois Central Telephone company, located in the 400 block on East Adams street, has been transferred from Clinton to the general offices at Streator, Illinois. The change was made last week when some of the office fixtures were moved to Streator.

Miss Edna Jones of Clinton, who had been employed in this department, has accepted a position as chief operator in the telephone exchange in Maroa.

GENERAL JOHN J. CARTY, NOTED TELEPHONE PIONEER, DIES

Brigadier General John J. Carty, one of the foremost scientists and engineers in the history of telephony, a former vice-president of the American Telephone & Telegraph company, and an important figure in the World War, died December 27 at John Hopkins hospital, Baltimore.

He retired in 1930 after more than half a century devoted to telephone engineering.

Born April 14, 1861, in Cambridge, Mass., Mr. Carty was graduated from the Cambridge Latin School and in 1879 he entered the Bell system in Boston.

Mr. Carty went to New York in 1887 as head of the cable department of the Western Electric company. Two years later he went to the New York Telephone company, then known as the Metropolitan Telephone & Telegraph company, as chief engineer.

Mr. Carty became chief engineer of the American Telephone & Telegraph company in 1907 and vice-president in 1919.

Under Mr. Carty's leadership, the transcontinental telephone line was completed January 25, 1915. Another achievement which he directed was the Boston to Washington underground cable system, 450 miles long.

Among his many contributions to the advancement of telephony was the invention of a test system for multiple switchboards and the first metallic circuit multiple switchboard. He also developed the so-called bridging bell which forms an essential part in all farmers' telephone lines and has played an important role in rural telephone development.

Previous to the entrance of the United States in the World War, Mr. Carty, worked with officials of the mobilization of the navy's communication forces which was carried out successfully in May, 1916.

Mr. Carty entered the service January 6, 1917, as a major in the Signal Officers' Reserve Corps. Acting in conjunction with the chief signal officer of the army, he organized twelve battallions of signal troops from the personnel of the Bell system throughout the country.

He organized the Research and Inspection Division of the American Signal Corps in France and served as chairman of the executive committee of the National Research Council in America.

His achievements not only brought him advancement to a brigadier general, but he became an officer of the French Legion of Honor and received the Distinguished Service Medal from General Pershing.

From the Emperor of Japan he received the Imperial Order of the Rising Sun and the Order of the Sacred Treasure.

ANNOUNCE DATES FOR TEXAS ANNUAL CONVENTION

The 28th Annual Convention of the Texas Independent Telephone Association will be held Tuesday and Wednesday, March 14 and 15, at Dallas. The name of the hotel in which the convention will be held and details regarding the program and convention arrangements will be announced at a later date.

The convention program will deal strictly with subjects and business matters in which the Independent telephone people are interested at this time, according to a bulletin received by the Texas Association.

KNOW the temperature of Your Solder

Improperly Heated Solder Makes—

POROUS JOINTS

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CABLE FAILURES

This means **lost revenue** and **maintenance expense**

THE DILLON TEMPEROMETER assures scientifically correct heating of wiping solder, and eliminates guesswork from this necessary factor in the wiping of gas-tight cable joints.

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50 HOURS-
TO LOCATE TROUBLE

that could have been averted if Kester Cored Solder had been used originally. Write us for *free samples* and an honest story of the solder situation. Kester Solder Co., 4210 Wrightwood Ave., Chicago, Ill., Newark, N. J., or Brantford, Ont., Canada

W. L. Runzel, President, brings to this organization 41 years' experience in the manufacture of this type of telephone equipment

Telephone and Switchboard Cords and Wire

May we quote you on your requirements?

RUNZEL CORD AND WIRE CO.

4727-31 Montrose Ave., Chicago

The Home of the Perfect Cord

INTERNATIONAL PHONE TAKES SWEDEN STOCK FOR KREUGER CLAIM

The International Telephone and Telegraph company announced acquisition of 610,000 shares of stock of the L. M. Ericsson Telephone company of Stockholm, Sweden, and said it has cancelled its claim against the bankruptcy estate of Kreuger & Toll for the amount paid for the shares.

Kreuger & Toll, before its financial collapse, held a controlling interest in the Ericsson company. International Telephone company closed a deal in 1931 whereby the Kreuger & Toll was to deliver the above amount of Ericsson stock in return for an undisclosed amount of International Telephone shares.

Arrangements have been made, the International company stated, to give it representation on the Ericsson board.

LOCAL MANAGER TELLS ROTARY OF 'PHONE BUSINESS

The workings of the Automatic Home Telephone company of Pontiac, Ill., were explained to Rotarians at a weekly luncheon meeting at the Elks' club by R. V. Rudy, local manager of the company.

There are 400 telephone companies in this state operating over 900 exchanges, Mr. Judy said at the outset of his talk. All of these exchanges are inter-related with one another and with other exchanges throughout the nation.

The telephone company stands alone as an individual business, the speaker remarked, to afford its subscribers a low rate for service and benefit to the telephone users. There can be no competition between telephone companies if these benefits are to continue, Mr. Judy added.

Policies of telephone companies, he said, are to extend to business and social interests a necessary means of communication at a low cost but at the same time with financial safety.

Obligations of the telephone companies are first to the users, next to the employees and last to the owners, Mr. Judy enumerated.

MASONIC SERVICES HELD FOR NEWARK PHONE EXECUTIVE

Masonic services for Harry P. McDonough were conducted at his home where he died at the age of 59 after a long illness. The Rev. Charles W. Walker conducted the funeral and Dr. J. A. Reed the Masonic ritual.

Mr. McDonough came to Newark, N. J., in 1909 to organize the Wayne Telephone company. He was president of the organization until it was merged with the New York Telephone company in February, when he became a member of the advisory board. He was vice-president and director of the Upstate Telephone association.

Officers of the telephone companies in the state who attended the funeral were: W. B. Woodbury, president, and D. C. Cox, vice-president, Friendship Telephone company, New York; from the New York Telephone company, W. K. Collins, division manager, Syracuse; J. H. Bernard, district manager, Syracuse; Stanley Vail, division plant manager; S. B. Cousins, division traffic superintendent; J. H. Boylan, president, Rochester Telephone corporation; H. H. Griswald, president, Ontario Telephone corporation.

Delegations were present from the Masons, Elks and Lions' Club.

Mr. McDonough left his wife, Myrtle, and two daughters, Josephine and Corinne.

DISTANCE LANCED

The dream of telephoned conversation between all parts of the world has almost come true. There are now 168,000 miles of international telephone circuits which connect with almost all the land telephones in the world, so that telephone conversation between the remotest part of South America and northern Europe, between South Africa and Chicago, or any other point in North America, between San Francisco and Manilla or Japan across the Pacific, in fact, between almost any two parts of the world, is not in only practical but is in almost daily use.

This telephone is one of those incredible marvels which we accept as commonplace because we have got used to the idea of talking with people at a distance.

ATHENS, OHIO, TELEPHONE CO. RUNS EFFECTIVE ADS IN PAPERS

Dr. C. L. Jones of the Athens (Ohio) Home Telephone company, is doing some mighty effective and constructive advertising in his local papers. Following is copy extracted from one of his company's ads which undoubtedly build up a great deal of good-will:

"Any utility that is endeavoring to serve the public efficiently has numerous problems that its patrons should know about. A wrong impression by the public often leads to embarrassment that should never exist if the exact and true conditions were better understood.

"'In the past week press reports have indicated that there is a great falling off in taxes received from public utility companies. This may apply to traction lines and transportation concerns but does not fit any communication situation. The Home Telephone Co's taxes are higher than they have ever been, and at a time of reduced income due to loss of patrons and poor collections.

"These conditions are certainly not a basis for rate reductions."

PROPOSED CHARGES SHOW REDUCTION OF 25 CENTS IN OHIO CITIES

Prospects of the early settlement of the telephone rate controversy here is seen with the passage of a motion at a special meeting of city council that a compromise rate, submitted by George B. Quatman, of Lima, general manager of the utility, and J. W. Longwell, manager of the Van Wert Home Telephone Co., be accepted.

The rates as approved by council are: Business phones, $4.25; residence phones, $2.50; residence party line, $1.75; rural phones, $1.90.

The new rate means a reduction of 25 cents on all rates except rural phones which gives a reduction of ten cents —$2 to $1.90—over present charges.

The motion also provides that all legal fees, approximately $2,000, be paid by the company.

Now You Can Live in the New 400 Room
PICKWICK ARMS
• • HOTEL • •
for as little as
$2 PER DAY
for room with bath
Weekly from $10
on the East Side convenient to Grand Central. Club facilities with completely equipped gymnasium, bridge rooms, etc. Excellent restaurant serving 55c luncheons, 75c dinners. "Food cooked the home way."
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WRITE FOR PRICES

Climbers

Bashlin Duplex & Stephens Quality Linemen's Equipment. Send for catalog No. 32, Dept. E. P. O. Box 173.

W. M. BASHLIN, INC.
GROVE CITY, PA.

Maintenance Equipment

MARTINDALE ELECTRIC COMPANY
1277 W. 4th Street
Cleveland, Ohio

Write for No. 16 Catalog illustrating and describing Commutator truing stones, Commutator grinding tools, insulation meters, Electric solderers, portable blowers, face masks, and about 50 other Maintenance products.

Poles

Finished Cedar Poles
VALENTINE CLARK CORPORATION
St. Paul, Minn.

Torches

No. 350
Duo-Duty Alcohol torch
Mechanically balanced
Heavy cast base
List price $3.50

THE LENK MFG. COMPANY
Newton Lower Falls, Mass.

TELEPHONE EXCHANGE SERVICE

Have you an exchange for sale or do you wish to buy one? We are in touch with both buyer and seller. Send us your data. Perhaps we can get together.

Telephone Service Association
1218-63 E. Lake St. Chicago, Illinois

NEW FACE MASKS DESIGNED FOR TELEPHONE MEN

Newspaper comments from all parts of the country stress the unusual good health of the American people based on reports of health authorities.

Probably this almost universal healthy condition of the people may be because

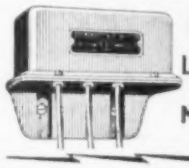
of the many health protecting devices now in use.

One of these devices is a face mask designed to be worn by men, women and children for the prevention of germs, irritating fumes, and dirt reaching the nose, throat, and lungs. These face masks are used by some of the employees in the telephone industry for protecting the health of the wearer against dirt, dust and disagreeable odors. Complete details, description and prices may be obtained by writing to Martindale Electric company, 1277 West Fourth Street, Cleveland.

NEW KELLOGG BOARD FOR GILSON

The Gilson Switchboard company of Gilson, Illinois, recently purchased a new 50-line magneto switchboard from Kellogg Switchboard and Supply company. The new switchboard is of the most modern type and Gilson subscribers will be assured of fast and dependable magneto service after the equipment is cut into service. The company plans to have the board in service early in June.

Lightning Arresters



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LIGHTNING ARRESTERS
MADE BY
MINNESOTA ELECTRIC CO
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COFFEY SYSTEM & AUDIT CO.
Exclusive telephone accounting since 1907.
Certified Public Accountants.
We install the well-known
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Audits—Rate Cases and Special Work.
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ACCOUNTING
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Certified Public Accountants
Specializing in Telephone Accounting and Rate Cases Since 1918.
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Telephone Equipment

RECONSTRUCTED EQUIPMENT

Kellogg Unbreakable type desk set with Chicago 4-bar 1600 ohm inside connection signal set @	$ 8.75
Kellogg No. 2696 type 4-bar 1000 or 1600 ohm Bdg. compacts @ $8.00—5-bar	9.00
Dean Elec. No. 240 4-bar 1000 or 1600 ohm Bdg. compacts @ $6.25—5-bar @	7.75
Western Elec. No. 20 desk set with No. 315 3-bar 1000-1600 or 2500 ohm inside connection signal set @	10.00
Western Elec. No. 22 3-bar Bdg. hand Gen. with cranks and screws @	1.50
Chicago Tel. Supply 4-bar Bdg. hand Gen. with crank and screws @	1.75
Chicago, Century, Eureka & Long Dist. 5-bar Gen. with crank and screws	2.00
Stromberg Carlson 1600 ohm self contained ringers with gongs @	1.50
Kellogg No. 97 C. B. desk sets with No. 75 Straight line steel Bell box @	7.00
Western Elec. No. 293 C. B. Straight line black finish wood hotel sets @	5.75
Western Elec. No. 294 C. B. Straight line short backboard type walnut finish wall sets complete @	3.75
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NATIONAL FIREPROOFING GETS ARMY ORDER

The aggressive continuation of an underground construction program in various army posts is indicated by a twenty carload clay conduit order recently placed with the National Fireproofing corporation of Pittsburgh.

The order calls for shipments of Natco clay conduit to Fort Bragg, N. C.; Fort Benning, Ga.; Fort Moultrie, S. C.; Barksdale Field, Fort Sill, Okla.; Vancouver Barracks, Wash.; Fort Sam Houston, Hex.; and Fort Leavenworth, Kan.

The conduit will be used to provide permanent and storm-proof housing for telegraph and telephone cables at the army posts. The work is being carried on under the direction of the Signal Corps, United States Army.

Shipments of a previous order for eighteen cars of clay conduit have recently been completed to Hamilton Field, Ignacio, Calif.; Rockwell Field, San Diego, Calif.; Fort Huachuca, Ariz.; Fort Leavenwoth, Kan.; Fort Sill, Okla.; Jefferson Barracks, St. Louis; and Bolling Field, Anacostia, D. C.

TELLS HOW 87 COMPANIES MAKE EVERY EMPLOYEE A SALESMAN

During a period when one of the big problems of business has been to maintain revenue, many companies have developed plans for using their "non-selling" employees for sales work. A digest of the employee-selling experiences of 87 retail, wholesale, service and manufacturing organizations using factory, office, and other employees to get business, is presented in a 48-page report entitled "Selling by Employees," published recently by the Policyholders Service Bureau of the Metropolitan Life Insurance company.

The first part of the report summarizes the experience of various companies which have adopted employee-selling plans. It discusses the different types of plans and factors to be considered in organizing an employee-selling program, and outlines the methods taken to insure the co-operation of the personnel. Part II presents in some detail a few typical plans. The report concludes with a list of references which may be useful to those wishing to draw up a plan for themselves.

The organizations whose programs are described in the survey represent many lines of business, selling a wide range of products and services in common use. The report states that the plans examined seemed to be an outgrowth of this line of reasoning: (1) "all employees have a certain number of relatives, friends and acquaintances; (2) if these employees can be converted into salesmen and their friends into customers, the result will be pofitable."

Chief executives, sales managers, personnel officers and others interested in the subject of all-employee selling activities may obtain copies of "Selling by Employees" by writing to the Policyholders Service Bureau, Metropolitan Life Insurance company, One Madison Avenue, New York City.

The Farmers' Independent Telephone company has asked permission to remove lines from the Wisconsin Telephone company exchange at Grantsburg, Wis., and establish a private exchange. The public service commission has set a date for a hearing there at the city hall.

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